MARINE REVIEW

VOL. XIX. Published every Thursday at 418-19 Perry-Payne Bldg., by the Marine Review Pub. Co. CLEVELAND, O., JUNE 8, 1899. Entered at Cleveland Postoffice as second class matter. No. 23

NEW SHIPS AT HIGH PRICES.

BRIGHT OUTLOOK FOR THE AMERICAN SHIP BUILDING CO.—ELEVEN BIG FREIGHTERS ALREADY UNDER CONTRACT FOR DELIVERY IN 1900—PURCHASE OF THE WHEELER YARD—THE 500 FOOTERS.

With eleven steel freighters of the very largest kind already under contract for delivery in the spring of 1900, the American Ship Building Co. (consolidated ship yards of the great lakes) certainly starts out with bright prospects. There is every reason now to expect that, notwithstanding prices of material which seem almost prohibitive, the big organization of lake yards will have closed within the next few months orders enough to keep all of its works fully employed until long after the opening of navigation next year. The orders above referred to do not include ships now at the launching stage, or even those that are to be delivered in September or October of this year. They relate to vessels for the Rockefeller interest, for the Minnesota Steamship Co., for John Mitchell and others of Cleveland and for A. B. Wolvin and others, on which work is only now being gotten under way.

Another meeting in Cleveland Wednesday between Mr. F. W. Wheeler and President W. W. Brown of the American Ship Building Co. resulted in final arrangements being made for the transfer of the Wheeler plant at West Bay City to the consolidation. The appraisement has been made and the price fixed and all that remains to be done is the examination of certain documents of title and ratification of the action of President Brown by his board of trustees. It is said that the Wheeler works will enter the consolidation on practically the same conditions that would have prevailed if they had been considered from the beginning. The price to be paid for the plant has not been given out, but it is understood to be sufficient to wipe out all indebtedness and still leave to Mr. Wheeler quite a sum of money for the struggle he has been engaged in during several months past.

Little more than a year ago, when several ships of 400 feet length were under way in different yards around the lakes, Mr. A. McVittie of the Detroit Dry Dock Co. (now Detroit Ship Building Co.) said that the next move would be to a 500-foot ship and that it would come at once. He was very positive in this statement and had gone so far as to have plans made of a ship of 500 feet length. That he was right is proven by the order just placed by Mr. A. B. Wolvin of Duluth with the American Ship Building Co. for four steamers, to be each 500 feet over all, 478 feet keel, 52 feet beam and 30 feet moulded depth. We will hear no more of the 400-footers when big lake freighters are talked of in the future. It will now be 500-footers. These new steamers, which are some 25 feet longer than anything at present afloat on the lakes, in addition to having 2 feet more beam and 1 foot more depth, will each move about 9,000 net tons of freight in a single cargo on 18 feet draught. The price given out in connection with the announcement of the contract, $350,000 each, may seem high, but it is probably not far off the actual figure, as it is understood 2¼ cents a pound is being paid for some of the material, as against a price of less than a cent a pound prevailing not many months ago. Then, too, these ships are to be fitted with quadruple expansion engines and Babcock & Wilcox water tube boilers, which involve much higher costs than Scotch boilers and triple expansion engines. Cylinders of the quadruple engines will be of 17, 25½, 39 and 60 inches diameter with 40 inches stroke, and the water tube boilers will supply steam at 250 pounds pressure. The ships will each have 15 immense hatches for the rapid handling of cargo.

These big steamers, ordered in the name of A. B. Wolvin, trustee, are undoubtedly for President Gates of the American Steel & Wire Co., James J. Hill of the Great Northern Railway and others interested in the development of mines on the Eastern Railway of Minnesota (branch of the Great Northern) that are to supply ore to the American Steel & Wire Co. and to other consuming interests. General Manager James Wallace of the American Ship Building Co. says that all four of the vessels will be built at the company's Lorain works. Two of them can be put down as soon as the delivery of material is begun. The keel for the third can be laid when the steamer Texas, now nearing the launching stage at the Lorain yard, slides into the water, and there will be ample time later in the year to get the fourth vessel so well under way that she may be delivered early in the spring of 1900.

CONTRACT FOR A TOW BOAT.

Bath, Me., June 6. (Spl. Cor.) The Staples Coal Co. has contracted with Kelley, Spear & Co. of Bath for a powerful iron tow boat which will be used for towing barges on the Taunton river. She will be 80 feet long between perpendiculars, 20 feet beam and 8 feet depth of hull. The machinery will be built by the Portland Co. of Portland, Me.

Saturday morning, June 3, the three-masted barge Pemberton was successfully launched from the yard of her builders, Kelley, Spear & Co., at Bath. This vessel is owned by the Staples Coal Co. of Taunton, Mass. She is 184 feet long, 35 feet beam and 16 feet deep. Her gross tonnage is 839 and the net tonnage is 735.

Monday morning, June 5, the wooden barge No. 16 was launched from the New England Co.'s yard at Bath. She is being built for the Consolidated Coal Co. of Baltimore. Her official measurements are: length 192 feet; beam 34 feet; depth 17 feet; gross tonnage 929; net tonnage 808.

It would seem to be a matter of small wonder that the Pacific Mail Steamship Co. recently contracted for new vessels, in view of the report that its earnings for the eleven months ending April 1 were $1,076,231, an increase of $504,468 over the same period last year.

ENORMOUS MOVEMENT OF IRON ORE.

THE OUTPUT IS ALREADY PRACTICALLY EQUAL TO SHIPMENTS AT THIS TIME A YEAR AGO, NOTWITHSTANDING THE LATE OPENING OF NAVIGATION—REVIEW OF THE FREIGHT SITUATION ON THE GREAT LAKES.

Vessel men and ore shippers alike were greatly surprised to learn that the output of iron ore to June 1 of this year is only 213,972 tons short of the output on the same date a year ago. The figures officially reported to the Lake Superior Iron Ore Association by dock managers at all upper lake ports are 2,120,067 gross tons to June 1, 1899, as compared with 2,334,039 gross tons to June 1, 1898. This means that an enormous movement of ore has been going on since the opening of navigation this year, the shipments exceeding the highest expectations of all interests and surpassing all previous records in the lake trade. It is understood, of course, that the opening of navigation in 1899 was full twenty days later than in 1898, as there was practically no shipments in April this year, but the loss is already almost fully made up as far as the ore trade is concerned. This rush of business early in the season proves that the mining companies, as was expected, have set out to bring down from the Lake Superior region every pound of ore that it is possible to get out of the mines, as there is no question of a market being found for all the ore that can be produced. Contrary to expectations, the docks and railroads at Lake Erie ports have provided equipment equal to the situation, and up to the present week vessels have been rushed in and out of port with more favorable despatch than has ever before been known in the trade; and in addition to all this ore freights have steadily advanced, until they have now settled, probably for some little time to come, at 75 cents from the head of Lake Superior, 70 cents from Marquette and 65 cents from Escanaba.

But this enormous ore movement has been in a marked degree to the disadvantage of the shippers of soft coal from Ohio ports, who have stood out against anything higher in rates than 30 cents to the head of Lake Superior and 40 cents to Lake Michigan ports—rates that are 50 per cent. higher than those of a year ago, but which have been refused for three or four weeks past by the vessel owners. The struggle between vessel owners and coal shippers on this score has been one of the hardest fought battles that has taken place in the lake trade for a long time past. The ship owners have sent their vessels up the lakes light in great numbers for ore, rather than accept the rates that were offered on coal. The question now arises: Have the vessel men gone too far in this regard? Have they offered ships in such numbers for the movement of ore as to endanger the chances of freights being kept up during the summer period of June, July and August. The vessel men themselves do not seem much worried on this account, but the coal shippers are claiming that the heavy movement of freight down the lakes has run its course and their turn is coming now. It is true that within the past few days the demand for grain carriers at Chicago is not what it has been since the opening of navigation, and for the first time this season vessels are crowded at Lake Erie ore docks, but whether or not more tonnage is to become available for the movement of coal no one can tell. Predictions in times of such radical advances in prices as have been going on for several months past are not of much account. The ore shippers have seen fit to advance freights in order to move their product, and are hoping with the success they have attained so far that they will have all their so-called "wild or moved early in the season and can rest easy if big strides are made in fall freights. Coal shippers, on the other hand, have held back their coal and are taking chances on finding a couple of months of dullness later on in which to move it. Probably they are right, but the vessel men do not agree with them, and the latter entertain recollections anyhow of having carried coal so long at a loss (some cargoes down to 15 cents last season) that there is no friendship shared between the ship and any part of the interests connected with soft coal.

PRICES OF SHIP MATERIAL ADVANCING.

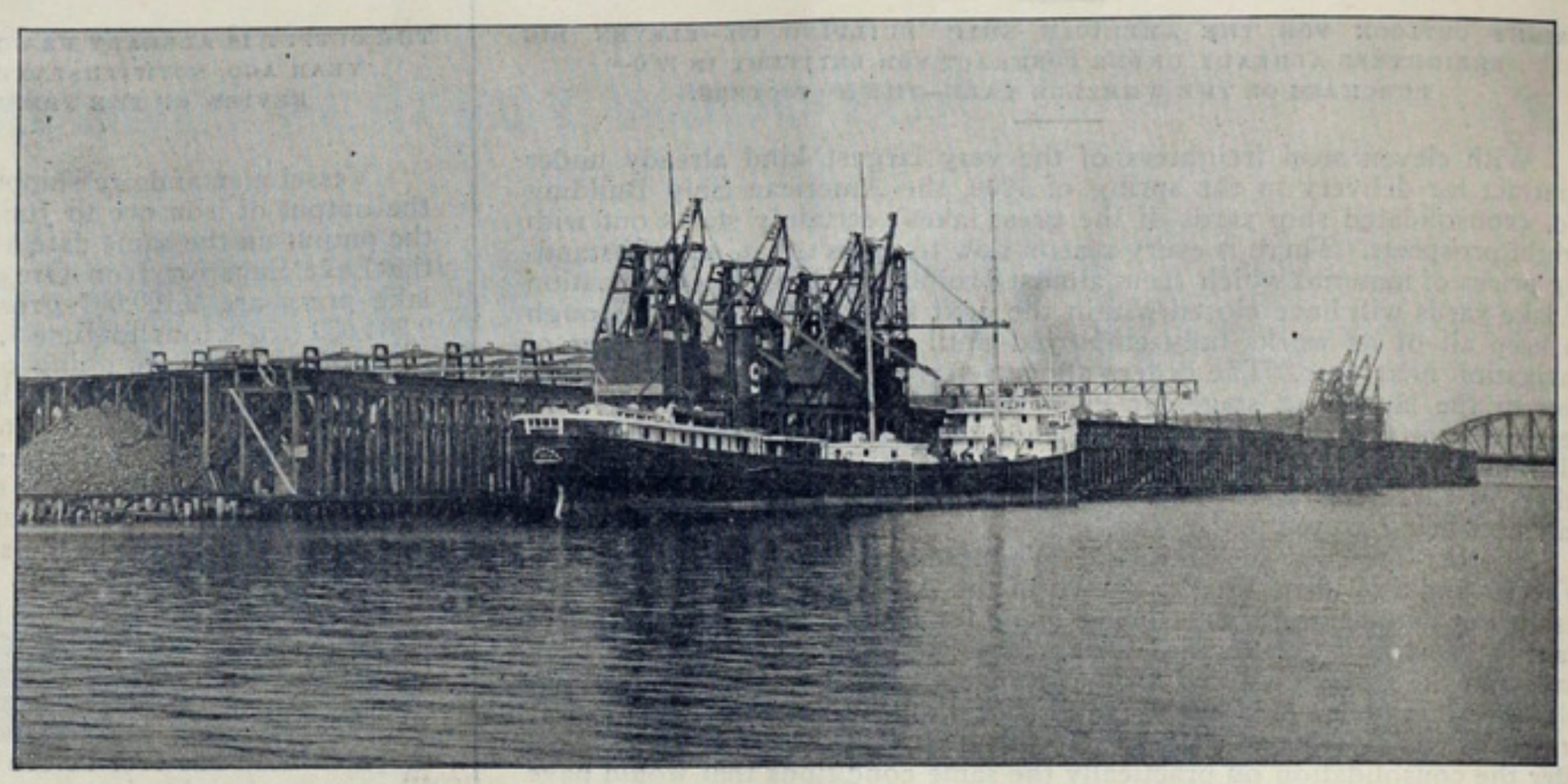
There appears to be no hope of a cessation in the steady advance in the prices of almost all materials entering into the construction of vessels. Ship plate is now quoted at $50 per ton, which in view of the fact that it was quoted less than a year ago at $20, indicates a considerable advance. A sale of 5,000 tons of plate on the great lakes during the past week was made at a price probably very near to the quotation given. Prices of pipe and other grades of material also show still further advances during the past few days and among the rumors of the week is the report of the formation of a lumber trust which is expected to play havoc with the estimates of wooden ship builders.

On a recent trip from Duluth to Conneaut, the Bessemer company's steamer Samuel F. B. Morse, towing one of the biggest of the Rockefeller barges (the two vessels carrying approximately 13,000 gross tons) made an average of 11.2 miles an hour for the entire distance from the head of the lakes to the ore unloading port, with no allowance of any kind for checks in the rivers or canals. Last season's record of 7,023 gross or 7,866 net tons of ore moved from Duluth to Conneaut in the Bessemer barge Roebling still leads the cargo list on the great lakes. It is not expected, of course, that any of the big steamers coming out this year, although of greater dimensions than the Bessemer barges, will equal them in capacity, as the barges have no space given up to machinery. The new Wilson line steamer Henry W. Oliver will probably carry 6,700 gross tons on the draught of close to 18 feet that is expected in the rivers later on.

SUPERIOR COAL DOCKS.

EXPENSIVE MACHINERY EQUIPMENT FOR THE UNLOADING OF VESSELS AT THE HEAD OF THE GREAT LAKES, WHERE COAL IS TRANSFERRED FROM VESSELS TO CARS FOR THE GRAIN FIELDS AND FOR NORTHWESTERN RAILWAYS.

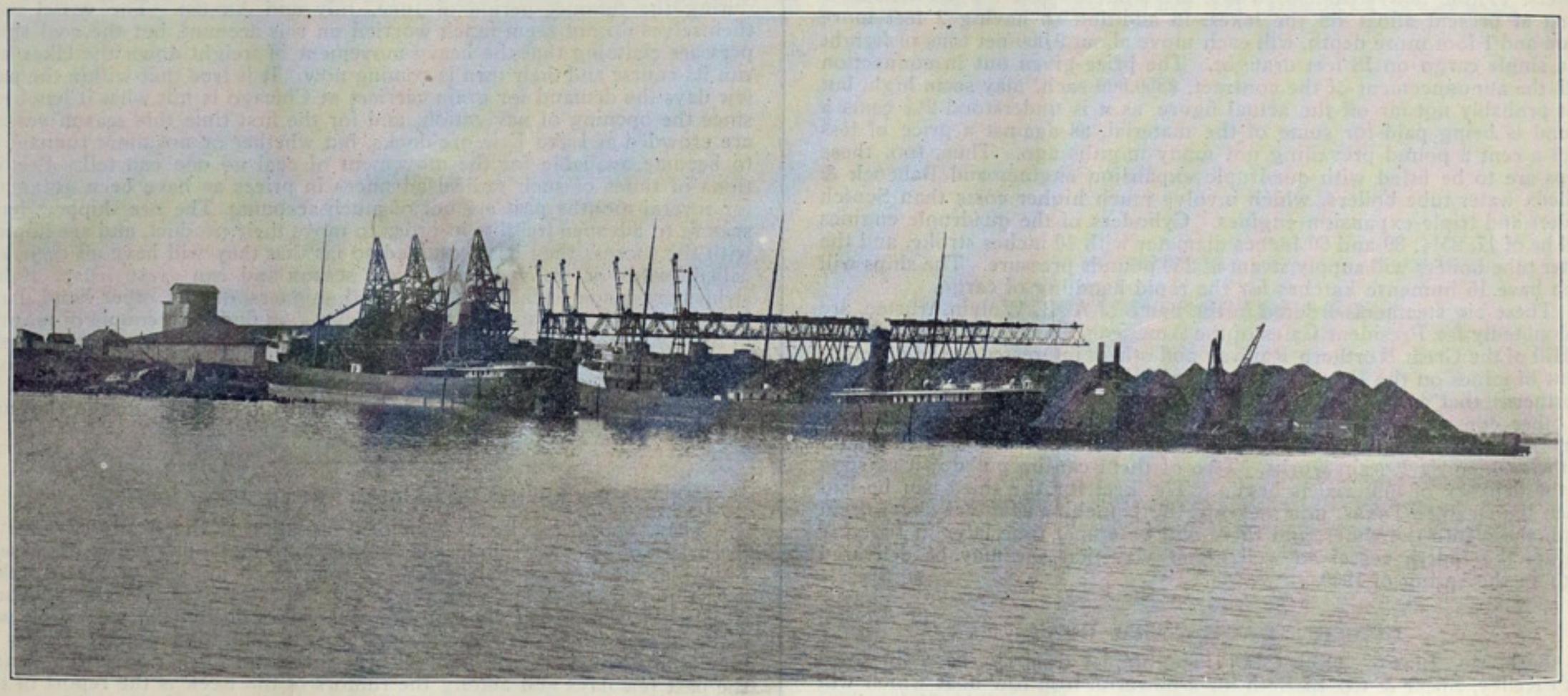
During the season of navigation in 1898 there was received at the port of West Superior, Wis., upwards of 2,000,000 tons of coal which was handled on docks that are probably the most complete in the matter of machinery equipment to be found in the entire country. The dock of the Northwestern Coal Railway Co. is perhaps the most interesting, since it enjoys the distinction of being the largest in the world. It is 450 feet in width and 2,000 feet in length, and has a storage capacity of over 600,000 tons of coal. Several vessels can, of course, be unloaded simultaneously. The rather novel system of machinery in use on this dock was designed, constructed and installed by the St. Paul Foundry Co. of St. Paul, Minn. The booms are designed to be thrown back and to allow a vessel to come close to the dock, and as each bridge moves independent of the others are set to unload from each hatch of the vessel. The normal capacity of each conveyor is in the neighborhood of 50 tons an hour in unloading from a vessel, while in loading from dock to car the capacity increases from 60 to 70 tons an hour per hoist. A great advantage in this system of handling coal over the wooden structure is the clear dock space and permanancy of the apparatus.



EXTERIOR VIEW OF THE ST. PAUL AND WESTERN FUEL COMPANY'S GREAT COAL DOCK AT WEST SUPERIOR.

The West Superior dock of the Youghiogheny & Lehigh Coal Co. was completed about three years ago. It is 300 feet in width by 1,200 feet in length, and has a storage capacity of 500,000 tons of coal. Three vessels can be unloaded at one time. The company has another dock—the Northern Pacific—at Old Superior, two docks at Chicago, and other docks at Fairport, Cleveland, and Erie, Pa. The dock at West Superior is equipped with the modern appliances, including separate unloading rigs for anthracite and bituminous coal. All the anthracite is screened by revolving screens and kept under cover.

The St. Paul & Western Fuel Co. has a commodious dock at Connor's Point, West Superior. This dock also averages 300 feet in width, while the length aggregates 1,500 feet, affording storage room for 200,000 tons of bituminous and 75,000 tons of anthracite coal. All the anthracite coal is kept under roof. Four lake vessels of the size ordinarily employed in the transportation of coal can be unloaded at the same time without the slightest inconvenience. These are but the most important of the nine immense coal docks on Superior, Allouez and St. Louis bays, but they will illustrate the enormous capacity of these storage places of the fuel for the entire northwest. The extensive harbor improvements now in progress or authorized at the head of the lakes are bound, of course, to prove highly beneficial to the coal interests. Last season the largest type of vessels were enabled to secure despatch of from 15 to 18 hours at the head of the lakes and many conditions combine to justify a hope that this year even more favorable records will be made.



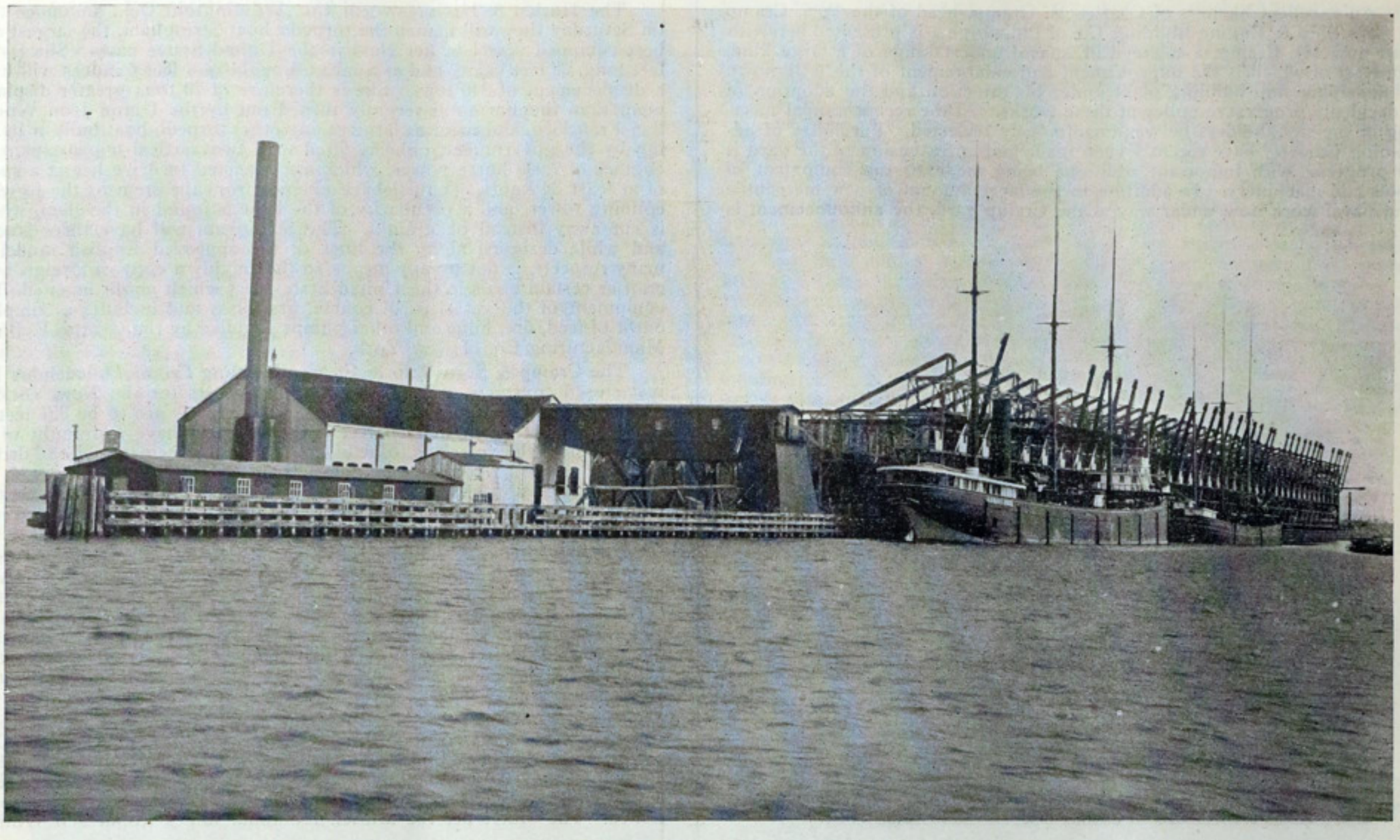
THE ENORMOUS DOCK OF THE YOUGHIOGHENY AND LEHIGH COAL COMPANY AT WEST SUPERIOR.

At a recent meeting of the Wm. Cramp & Sons Co. the old board of directors was re-elected with the exception of Mr. Seligman,, who was replaced by Edwin S. Cramp. The net profits for the year just closed were $707,832, an excess of $133,991 over last year.

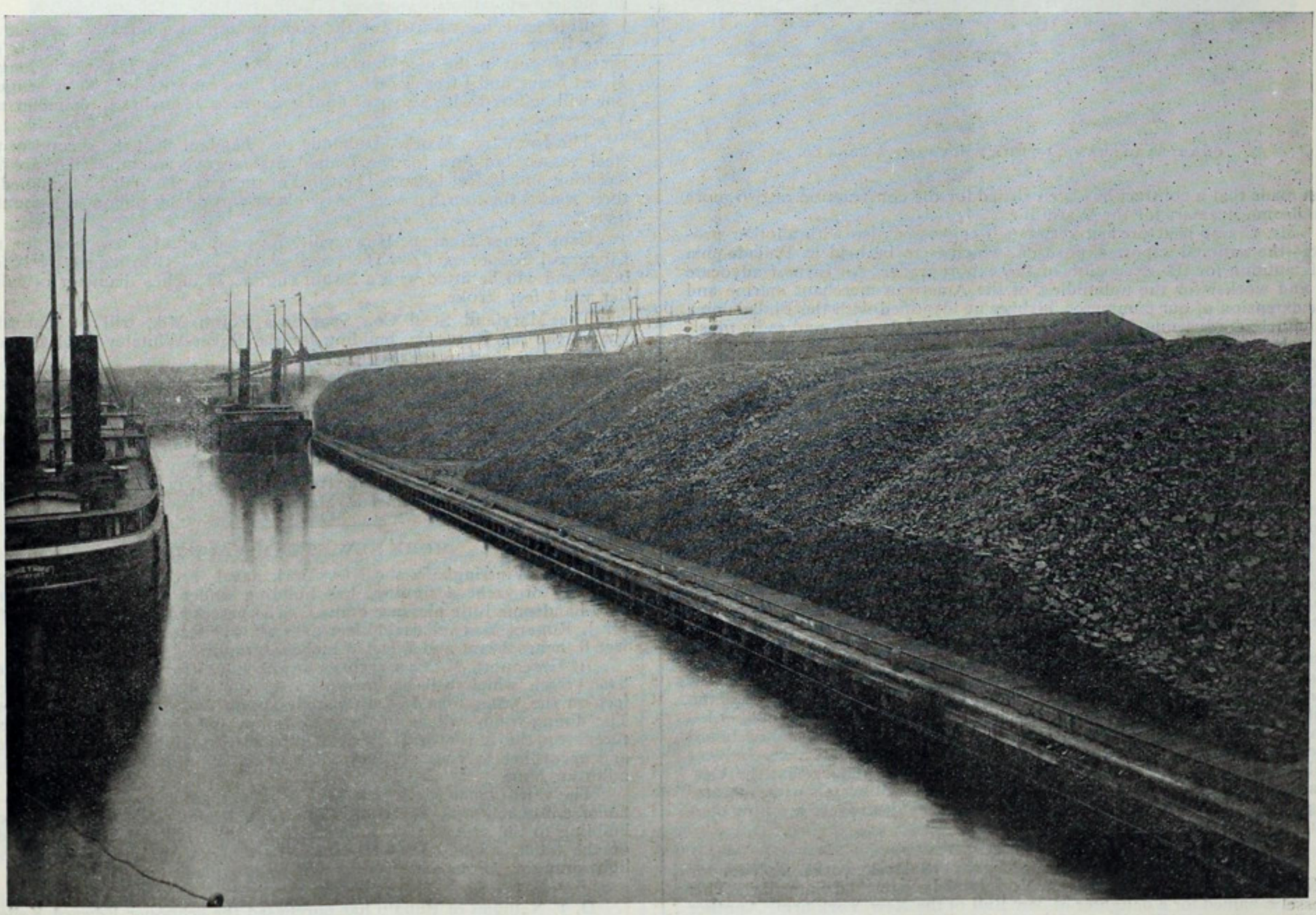
UPHEAVAL IN THE NAVY DEPARTMENT.

Secretary of the Navy Long has appointed a board, headed by Assistant Secretary Allen as president, and composed of Rear Admiral Rodgers, president of the board of inspection and survey, Rear Admiral O'Neil, chief of the bureau of ordinance, Rear Admiral Hichborn, chief of bureau of construction, and Rear Admiral Endicott, chief of the bureau of yards and docks, to consider plans for expiditing the work of the various bureaus of the navy department and insuring harmonious action by them. It would not be at all surprising if the institution of a permanent board, somewhat similar to the British admiralty, would be the outcome of the investigation which is, of course, fraught with no little significance. Indeed it is known that a scheme has already been proposed looking to the permanent installation of Admiral Dewey at the head of a board, with two sea-going rear admirals to pass upon all matters affecting the fleet, to direct the bureaus in the designing, building and repairing of ships, and, in short, to control, under the secretary's approval, all matters of detail in the navy.

There is no doubt that there is an opportunity for the accomplishment of a number of such needed reforms in the radical reorganization of the navy department on a business basis. It will be the first duty of the new board to revise the regulations of the working bureaus of ordnance, engineering, construction, equipment and yards and docks, redefining the duties of each, and the extent of their authority afloat and ashore, with a view to fixing responsibility and preventing duplication of work. No one who has to do with the navy department is in ignorance of the general dissatisfaction given by the present system. The engineers claim that the constructors should be confined in their jurisdiction to hulls, the constructors claim that dry docks are tools, the civil engineers want the navy yards under a single head, and finally there is the confusion inevitable in a system where the engine which drives a dynamo belongs to one bureau, its foundation to another, the current to another, and the ventilating fan, if one is attached, to still another. The general conflict has only been increased by the merging of the engineers and line by the personnel bill. Now the board will wrestle with all these problems, as well as with a proposition to give constructors control of all shore work, confining the line officers exclusively to sea duty.



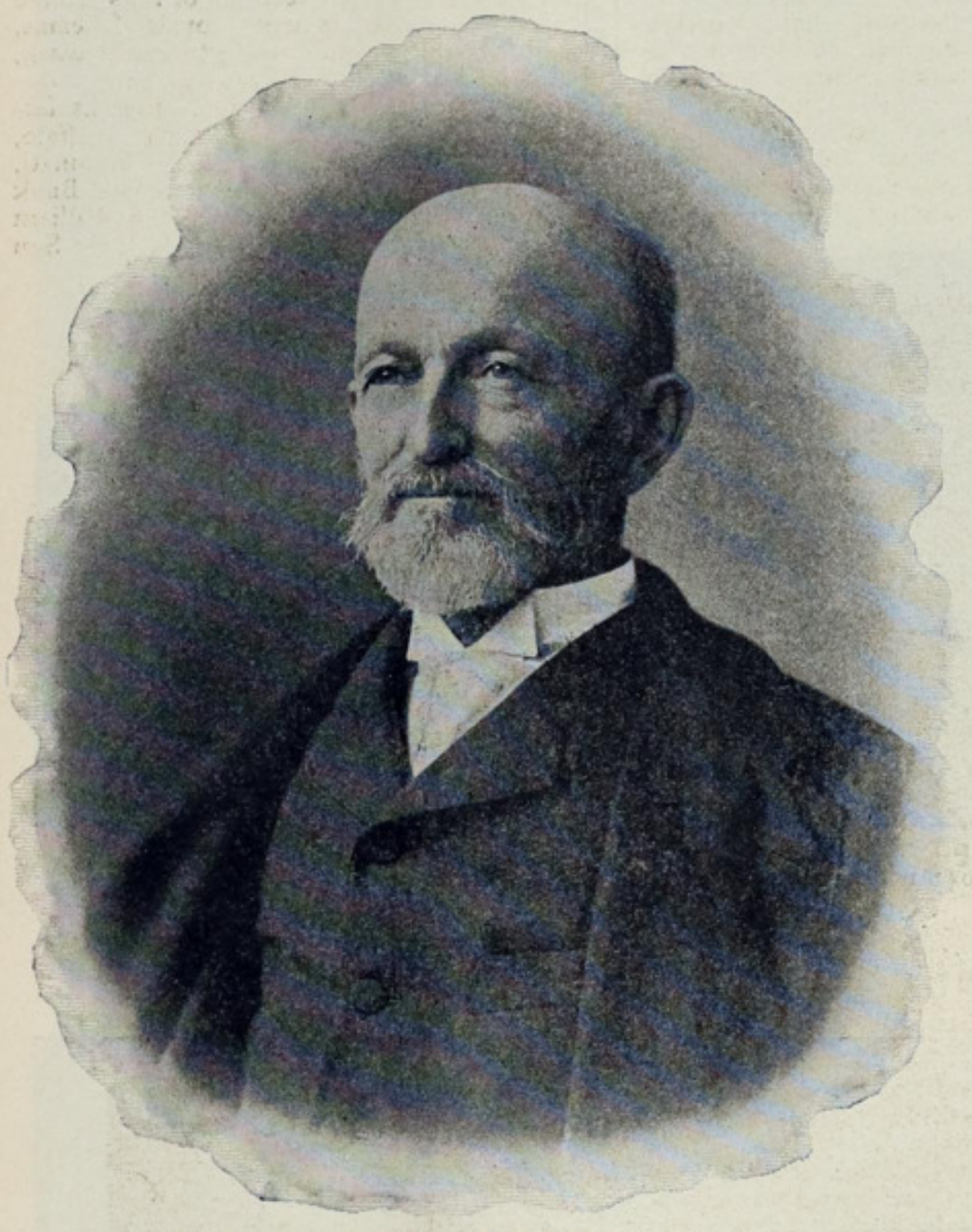
VIEW OF NORTHWESTERN COAL RAILWAY COMPANY'S COAL DOCK AT ALLOUEZ BAY, WEST SUPERIOR, WIS.



RECEIVING DOCK OF THE PHILADELPHIA & READING COAL AND IRON COMPANY, WEST SUPERIOR, WIS.

CHARLES HENRY CRAMP.

An excellent likeness of Charles H. Cramp, head of the Wm. Cramp & Sons Ship & Engine Building Co. of Philadelphia is presented herewith Just now Mr. Cramp is engaged in several undertakings of a large kind, not least of which is the improvement and enlargement of the wellknown Philadelphia ship building plant under his direction and the adoption of a decidedly progressve policy at these works. At the recent annual meeting of the stockholders he was unanimously reelected. Purchases of adjoining property have recently been made and an extension of the yard is in progress, with important additions being made to the equipment of tools and machinery. In addition to the large amount of new mercantile and naval work now under way at the Cramp yard, the announcement is



CHARLES H. CRAMP, OF THE WM. CRAMP & SONS CO.

just made that a contract has been closed for the construction of two more handsome steamers for the Ward line.

Mr. Cramp is at present very much engrossed also with another project—the national export exposition, which is to be held in Philadelphia this autumn for the expansion of the export trade. An earnest advocate of and worker for the upbuilding of the American merchant marine and the extension of our commerce, he became identified with the Philadelphia Commercial Museums from the very inception of the idea, and as its president has rendered most efficient service. It was therefore only natural that Mr. Cramp should take a lively interest in a kindred subject, the projected exposition, and when he was made a director of the exposition association he went to work with a will to help make the display a success. He has also been for years a manager of the Franklin institute.

TRIP OF SCHICHAU TORPEDO BOAT DESTROYERS.

In a letter to the Review Mr. F. Schichau, of Elbing, Germany, the well-known builder of torpedo boats gives some particulars of the voyage from Elbing to northern China of the four torpedo boat destroyers recently built at the Schichau works for the imperial Chinese navy. The destroyers, which were described and illustrated in the Review some time ago, attracted considerable attention by reason of the fact that on their trial trips they attained in free open sea a mean speed of from 35 to 37 knots, the highest speed ever attained by any vessel afloat.

The trip of the four destroyers to their port of delivery proves conclusively the sea capacity of the vessels. They steamed through the Baltic, the German ocean and Biscay, around Gibralter, through the Mediterranean sea to Port Said, and finally made the run from Port Said to Colombo without touching at the port of Aden—a distance of 3,550 sea or 4,100 statute miles. Upon arrival at Colombo the destroyers each had on board a considerable quantity of coal, which constitutes, of course, an eloquent tribute to the Schichau engines. It would seem moreover that the German builder has solved the problem of building small vessels with a steaming radius of from 3,000 to 4,000 sea miles. The destroyers are now continuing their voyage to North China.

The Mae, of the steamers building at the Craig works, Toledo, for Miller, Bull & Knowlton of New York, will be launched Saturday. This vessel is named for a daughter of Mr. Bull of the New York firm. Another of the vessels, the Winnifred, is named for the daughter of Mr. Knowlton, also of the firm of ship owners.

SHIP YARD HAPPENINGS.

The Harlan & Hollingsworth Co., Wilmington, Del., announce that on Saturday they will launch the torpedo boat Stringham, the largest and best equipped vessel of her class in the United States navy. She is 225 feet long, 22 feet beam, and at a mean draught of 6 feet 6 inches will have a displacement of 340 tons. She is therefore of 70 tons greater displacement than the Farragut, recently turned out by the Union Iron Works, San Francisco, and twice as large as any other torpedo boat built or building by the government. She is fitted with two vertical triple expansion engines of 7,000 horse power, which are expected to drive her at a speed of at least 30 knots. A turtleback extends from the stem to the forward conning tower, and a peculiarity of the boat is found in the stem, which is cut away instead of straight. The Stringham will have three stacks, and while designed along the lines of the approved English model in many respects, is not by any means so thoroughly a copy of foreign built craft as certain boats in the United States fleet which might be cited. The equipment of the vessel is, of course, first class and includes a complete outfit of feed, fire, bilge and other pumps supplied by the George F. Blake Manufacturing Co. of New York.

The Cramp & Sons Ship & Engine Building Co. of Philadelphia has just closed contracts to build two more steamers for the New York & Cuba Mail Steamship Co.—Ward line. The vessels are to be 357 feet in length, 47 feet beam and 36 feet deep, and will have a draught of 20 feet. Each of the vessels is to be of 6,200 tons displacement, will be driven by twin screws. Accommodations will be provided in each vessel for ninety first-class passengers, fifty second-class and seventy-five steerage. Under the terms of the contract one of the vessels must be completed in a year and the other six months later.

Charles Reeder & Son of Baltimore will about the middle of June launch the steamer building for the Queen Anne Railroad Co. for service between Baltimore and Queenstown. She is 210 feet over all, 200 feet between perpendiculars, 30 feet beam molded, 50 feet beam over guards and 10 feet depth. The beam engine for this vessel has a cylinder 46 inches diameter and 10 feet stroke, to which steam will be supplied from two cylindrical boilers, 12 feet in diameter by 11½ feet long, at a working pressure of 50 pounds.

The four-masted schooner Robert R. Hind, building for Hind, Rolph & Co. of San Francisco, was launched at the ship yard at Alameda, Cal., a few days ago. The Hind is 163 feet long, 38 feet beam and 13 feet deep, and will carry 700,000 feet of lumber or 1,100 tons of sugar. She is one of a fleet of five similar vessels built or building by the firm above mentioned. The others are the Muriel, Honoipu, James Rolph and William Carson.

Arthur D. Story of Essex, Mass., has just closed a contract to build for the Lynn & Boston Steamship Co. a steamer 140 feet long, 30 feet beam, 9½ feet depth of hold and 7½ feet draught, loaded. Accommodations will be provided for 200 passengers, and the vessel, which will cost $65,000, will be provided with an electric light plant, steam windlass and all modern appliances.

Bids have been asked for the construction of a ferry for service on Lake Washington, Wash. The vessel, which will be of wood and is expected to cost in the neighborhood of $23,000, will be 124 feet in length, 44 feet beam, and 4 feet draught, and will have capacity for 200 passengers. She will be fitted with a pair of double engines, 14 inches in diameter and 5 feet stroke.

The Iowa Iron Works, Dubuque, Ia., has launched the second of the steel vessels building for the United States government. They are 200 feet long and 40 feet beam. The third of these vessels will be launched in three weeks, the fourth a week or two later and the fifth about two months hence.

Capt. James Hennen, Hawesville, Ky., will build a tow boat for the Cincinnati Cooperage Co. The vessel will be 115 feet in length by 22 feet beam and will be fitted with a Swain engine, 12 inches diameter of cylinder and 6 feet stroke.

The Maryland Steel Co., Sparrow's Point, Md., will on Saturday launch the tug Britannia, building for the Baker-Whiteley Coal Co. and recently described in the Review.

The R. M. Spedden Co. of Baltimore has secured from the light-house board a contract for repairs on the Cape Charles light ship amounting to $5,100.

Eli W. Hanson of San Francisco, and several other practical ship builders, will establish a yard at Fairhaven, Wash.

A. J. Wonderley, Covington street, Baltimore, is building a handsome steam yacht for Capt. Samuel B. Marts.

MORE NEW STEAM YACHTS.

H. C. Wintringham, the New York naval architect who makes a specialty of yacht designing, has building under his supervision three very handsome little pleasure crafts. The vessel building at Wilmington for J. Rogers Maxwell is 146 feet over all, 117 feet on the water line, 18 feet 6 inches beam and 7 feet 3 inches draught.

At Greenport, N. Y., a yacht is on the stocks for Nathaniel Witherell. The vessel, which will be known as the Reba, is 110 feet over all, 91 feet on the water line, 15 feet 9 inches beam and 8 feet 8 inches depth. The dining-room will be in the pilot house and there will be four state rooms on the lower deck. Triple expansion engines will be provided, and according to contract they must drive the vessel at a speed of 15 miles an hour.

The third yacht for which Mr. Wintringham prepared the plans is under construction at Port Jefferson, Long Island. She is the Lavrock, building to the order of W. J. Matheson, and is 100 feet over all, 83 feet on the water line and 15 feet beam. A feature of the vessel will be her light draught. Four state rooms will be provided.

D. J. Nelligan of Buffalo has purchased the schooner Edward Kelley, 737 tons, from Joseph H. Smith and Charles A. Slayton of Tecumseh, Mich.

THE CARNEGIE STEEL CO., LTD.

A BRIEF SUMMARY OF THE WORKS OWNED AND OPERATED BY ONE OF THE GREATEST INDUSTRIAL CONCERNS OF THE WORLD.

In the following short paragraphs a brief summary is made of the works owned and operated by the Carnegie Steel Co., Ltd., which has an annual capacity of 2,300,000 gross tons of pig iron, spiegel eisen and ferro-manganese, 2,050,000 tons of Bessemer steel and 1,400,000 tons of open-hearth steel. No reference is made to the Oliver iron mining interests or the Frick coke interests which are very closely related to the Carnegie company:

Edgar Thomson Furnaces at Bessemer, two miles from Pittsburg, on the Pennsylvania, the Baltimore & Ohio, the Pittsburg & Lake Erie, the Pittsburg, Bessemer & Lake Erie, and the Union railroads, and the Monongahela river. Nine stacks. Product: Bessemer pig iron, spiegel-eisen and ferro-manganese. Annual capacity, 1,000,000 gross tons.

Duquesne Furnaces at Duquesne, four miles from Pittsburg, on the Pennsylvania and the Union railroads, and the Monongahela river. Four stacks. Product: Bessemer pig iron. Actual capacity, 800,000 gross tons.

Carrie Furnaces at Rankin, one mile from Pittsburg, on the Baltimore & Ohio and Pittsburg & Lake Erie railroads, and the Monongahela river. Two stacks. Product: Bessemer and Basic pig iron. Annual capacity, 250,000 gross tons.

Lucy Furnaces at Fifty-first street, Pittsburg, on the Allegheny Valley railroad. Two stacks. Product: Bessemer, forge and foundry pig iron. Annual capacity, 250,000 gross tons.

Edgar Thomson Steel Works at Bessemer, two miles from Pittsburg, on the Pennsylvania, the Baltimore & Ohio, the Pittsburg & Lake Erie, the Pittsburg, Bessemer & Lake Erie and the Union railroads, and the Monongahela river. Four 15-gross-ton Bessemer converters. Product: Bessemer steel rails and billets and iron and brass castings. Annual capacity, 1,000,000 gross tons of steel ingots and 50,000 tons castings.

Duquesne Steel Works at Duquesne, four miles from Pittsburg, on the Pennsylvania and the Union railroads, and the Monongahela river. Two-10-gross-ton Bessemer converters. Product: Rails, billets and splice bars. Annual capacity, 650,000 gross tons of steel ingots.

Homestead Steel Works at Munhall, one mile from Pittsburg, on the Pennsylvania, the Pittsburg & Lake Erie and the Union railroads, and Monongahela river. Two 10-gross-ton Bessemer converters; forty open hearth furnaces. Product: Blooms, billets, structural shapes, bridge steel and armor plate, boiler, ship and tank plate, and steel castings. Annual capacity: 400,000 gross tons of Bessemer steel ingots and 1,400,000 tons of open-hearth steel ingots. Finishing capacity of armor plate department, 10,000 gross tons per annum.

Upper Union Mills at Thirty-third street, Pittsburg, on the Allegheny Valley railroad. Product: Structural steel, steel bars and steel universal mill plates. Annual capacity, 250,000 gross tons.

Lower Union Mills at Twenty-ninth street, Pittsburg, on the Allegheny Valley railroad. Product: Universal mill plates, car forgings, bridge work, angles, axles, links, pins and bar steel. Annual capacity, 130,000 gross tons.

Keystone Bridge Works at Fifty-first street, Pittsburg, on the Allegheny Valley railroad. Product: Steel bridges, especially for railroads, elevated railway structures and steel frames for modern office buildings. Annual capacity, 50,000 gross tons.

The product of these works in pig iron and steel, the extent of which is referred to above, is manufactured into armor plate, billets (1½ in. up), blooms and slabs; forgings, such as axles, arch bars, pins and other car forgings, connecting rods, crank shafts, locomotive frames, eye bars; plates for boilers, bridges, ships and tanks; steel rails of 16 to 100 pounds per yard; steel splice bars (plain and angle) for all sections of rails; rolled structural shapes, such as angles, rounds, flats, squares, ovals, I-beams, channels, bulb angles, deck beams, tees, zees, etc.; and structural work, such as bridges, buildings, elevated railroads, girders, columns, etc.

The company maintains its own offices in the principal cities as follows: Atlanta, Equitable building; Boston, Telephone building; Buffalo, German Insurance building; Chicago, Marquette building; Cincinnati, Neave building; Cleveland, Perry-Payne building; Denver, People's Bank building; Detroit, Hammond building; London (Eng.) 71 King William street; Minneapolis, Guaranty Loan building; Mexico City, Calle de San Francisco, No. 8; Montreal, Bell Telephone building; New York, Empire building; Philadelphia, Harrison building; St. Louis, Chemical building; San Francisco, 258 Market street; Washington, National Safe Deposit building. General office and headquarters are in the Carnegie building, Pittsburg, with telegraph and telephone connections with all of its sales offices and works.

Open Pit Mining of Iron Ore on Mesaba Range, Minnesota.

RAINFALL ON THE GREAT LAKES.

Alfred J. Henry, chief of division of the United States weather bureau, has prepared for the monthly bulletin of the bureau some comprehensive statistics of the rain fall in the great lakes region during the past six months. Less than the normal amount of rain and snow fell during this period at the great majority of stations on the great lakes. The fall was above normal at only two American stations, Detroit and Oswego, and at about 33 per cent. of the stations on the Canadian side. On the whole, less than the average amount of rain and snow fell on both sides of the boundary line, the deficiency being greatest in the Lake Michigan basin, where the accumulated departure amounted to as much as 7 inches in some cases. The normal annual precipitation of the several basins, giving equal weight to all the available records, is about as follows: Lake Superior, 28 inches; Lake Michigan, 33 inches; Lake Huron, 32 inches; Lake St. Clair, 35 inches; Lake Erie, 36 inches; and Lake Ontario, 39 inches.

In presenting this data the author says: "It is not expected, of course, that immediate practical results will follow from the records of precipitation here given, but we may anticipate in a measure, at least, one of the important needs of persons having to do with problems of interlake navigation and the improvement of existing waterways. The distribution of precipitation and its relation to the fluctuations of the surface level of the lakes are subjects of much importance, yet it is not possible from the figures given alone to draw positive conclusions as to the relations which exist between precipitation and lake levels."

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

Published every Thursday at No. 418-19 Perry-Payne building, Cleveland, Ohio, by THE MARINE REVIEW PUBLISHING CO.

Eastern Agents—The Samson Advertising Agency, 102 and 104 Fulton St., New York, N. Y.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, $1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

Since the beginning of the war with Spain our government has undertaken some big things in the way of buying and building ships, but an occasional summary even now of what is going on all the time in England and Scotland makes operations on this score in America appear rather small. At one ship yard on the Clyde, that of the Fairfield company, there is at present under contract for the Admiralty ships to the value of about $15,000,000. The list includes eight vessels of 59,720 tons and 126,000 horse power, as follows: Africa, first-class armored cruiser, 14,100 tons, 30,000 horse power and 23 knots speed; first-class armored cruiser just ordered, 9,800 tons, 22,000 horse power, 23 knots; Cressy, first-class armored cruiser, 12,000 tons, 21,000 horse power, 21 knots; Aboukir, first-class armored cruiser, 12,000 tons, 21,000 horse power, 21 knots; Hermes, second-class cruiser, 5,600 tons, 10,000 horse power, 20 knots; Highflyer, second-class cruiser, 5,600 tons, 10,000 horse power and 20 knots; also two 30-knot torpedo boat destroyers of 310 tons and 6,000 horse power each.

A Philadelphia exchange says: "Owners of undocumented pleasure craft purchased abroad will be interestd to know that their crews are not entitled to the benefits of the United States marine hospial service. In the case of the Philadelphia steam yacht May, which is a foreign-built vessel owned by citizens of this country and protected by the United States government, Dr. Austin, chief of the United States marine hospital service in this city, has decided that none of the crew is entitled to the benefits of the service. This decision, Dr. Austin states, has been affirmed by the department at Washington. He says while he is willing to give them medical advice gratuitously he cannot under the ruling of the department furnish medicine or hospital service to any undocumented vessel. Foreign-built pleasure craft are only permitted to fly the flag of this country on the provision that their owners do not engage in business for a profit. Otherwise the vessels will be forfeited to the government."

Hon. Thomas B. Reed, ex-speaker of the House of Representatives, in an article on "The Nicaragua Canal" in the current number of the North American Review, says: "Congress has probably done well in giving ample funds in the last river and harbor bill for the full examination of both the proposed canals, and if that sum is used wisely by the selection of unprejudiced, sensible sources of information, we shall all be better off. There ought not to be any tolerance in regard to opinions on this great and important enterprise. It is too difficult a problem to be mastered by enthusiasm alone. Sound sense and discretion must also be called into actio· The final result no one can doubt. The commerce of the world in due time will eliminate Cape Horn to as complete a degree as it has eliminated the Cape of Good Hope."

Ohio Republicans lead off with a strong plank in their platform favorable to encouragement to our merchant marine and endorsing the measure presented to the last congress by Senator Hanna. Here is the sentiment of the party in Ohio as expressed at the state convention in Columbus, a few days ago: "For the national defense, for the reinforcement of the navy, for the enlargement of our foreign markets, for the employment of American working men in the mines, forests, farms, mills, factories, and ship yards we demand the immediate enactment of legislation similar to that favorably reported to each branch of the Fifty-fifth Congress at its last session, so that American built, American owned, and American manned ships may regain the carrying of our foreign commerce."

In a paper read before the Society of Marine Engineers, St. Petersburg, Messrs. Zvorykin and Blumenthal explained their invention for revealing automatically a leak on board ship. In the hold of the vessel a cage is fixed containing a lever with counterbalancing weight. The presence of water disturbs the balance and brings the lever in contact with an electric apparatus, which then lights a lamp in that part of the hold and rings a bell. Two of these contrivances are to be placed experimentally aboard the General Admiral Apraksin, battleship.

The Troy & Albany Steamboat Co.'s new steamer W. H. Frear has gone into commission and excites much admiration in Hudson river shipping circles. She is 160 feet in length, 45 feet beam and 9 feet depth and will accommodate 1,000 passengers. Her speed is estimated at 14 miles an hour. The engine was taken from the steamer W. M. Whitney but is almost new. New boilers were furnished by the W. & A. Fletcher Co. of Hoboken, N. J., and the vessel has an electric light plant of 125 incandescent lamps.

Nikola Tesla was the guest of honor at a recent meeting of the Commercial club of Chicago and entertained his auditors with his latest project in the form of a proposed submarine boat which its inventor affects to believe can be both propelled and steered from shore without the use of wires. The electrician performed a number of experiments to demonstrate his invention.

It is stated that the Northern railway of France will substitute for one of its paddle wheel steamers for channel service a vessel of some 1,800 tons displacement which will be fitted with triple screws.

COMPRESSED AIR FOR SAVING SHIPS.

The difficulties attending the release of the steamer Paris, and of course likely to be encountered to some extent by any ocean liner, have been taken by Frank Richards as the text for an article in the current number of the American Machinist. He says in part:

"There is a means of expelling the water from the filled compartments so obvious, so indisputably adapted to the purpose, and so certainly effective that it seems unaccountable that some engineer has not suggested it before this. Close the hatches of the flooded compartments and drive the water out by forcing air in. As a pressure of 1 pound of air (or of anything else) more than balances 2 feet of water, a pressure of 10 pounds would more than balance and expel the 18 feet of water said to be in the hold. It is not necessary to speak of any of the details of the application, as any engineer should be competent to look after them. It would not, of course, make the slightest difference how big the holes might be in the bottom, as the water would be expelled and kept out on the same principle as in the old-fashioned diving bell. The pressure against the bulkheads could be met by timbers extending from one to another. The deck should certainly be strong enough to resist the upward pressure. The pressure could never be greater than just sufficient to expel the water, as the surplus air would at once begin to follow it and escape. There should not be any difficulty, either, for an emergency like this, and with compressed air in such wide use, in finding air compressors, or even blowing engines, that in a few hours could be rigged to supply the air. With a copious supply of air the safety of the vessel could be assured between tides.

"The saving or the loss of the Paris becomes a trivial and a transient matter in itself in comparison with the larger lesson which her predicament enforces. Beyond the device of the separating bulkheads, when their doors are happily closed and they are strong enough to resist the pressure, the one solitary hope for a leaky ship is pumping. It is a fight at once between the leak and the pump, and only comparatively small leaks are defeated by the pump. The saving efficiency of the pump is not the full capacity of it, but only the difference between its capacity and that of the leak. If the leak rate is nine and the pump rate is ten there is some hope that the pump may win, but it all depends upon the prolonged maintenance of the one-tenth of excess. The pumping out of a leaky ship is a very different thing from pumping out a tight one. The work is not only so enormously wasted while it is going on, but it never is finished. The necessity for pumping is as unrelenting after hours or days of work as at the beginning.

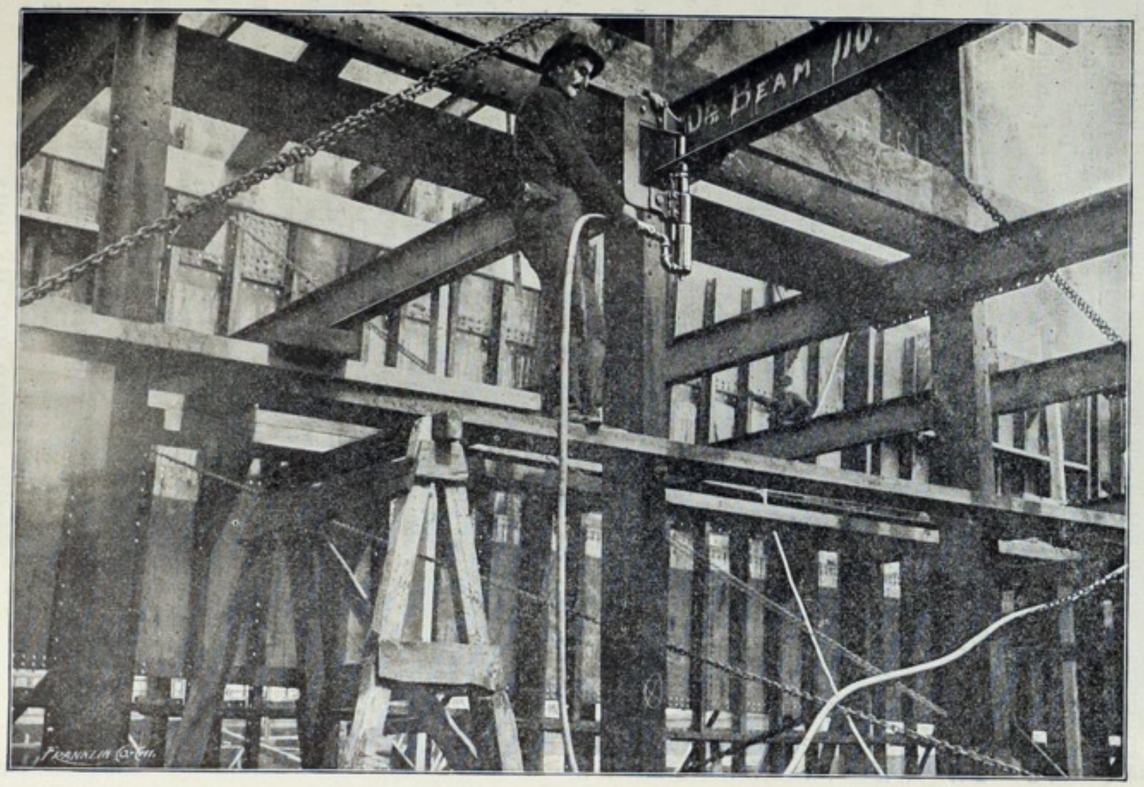
"In the use of air pressure for expelling water there is none of this wasted work. All of the air pressure applied above the water is effective in driving it down. The leak is stopped the instant the pressure above the water is sufficient to balance the pressure that is driving it in. Supposing the ship to be afloat, and not on the rocks, she is saved at that moment. The expulsion of the water after that is only a question of time, and not one of uncertainty or of anxiety; and after the water is expelled there is nothing more for the air compressor to do but to maintain the pressure. As I said before, it would make no difference to the air as to how big the leak might be, and it would, of course, work a little better against a big leak than against a little one, as the water would flow out more freely. The leak against which the pump would be useless would find the air compressor at its full effectiveness. The air would, of course, only drive the water down to the level of the leak, as it would then find its opportunity to escape; but leaks usually occur on the bottom or far below the water line. Supposing the system of air protection against leakage to be generally adopted, and provision for the employment of the air to be provided for in the design and construction of the ship, there would, of course, be air-locks provided in the bulkheads or the decks, by which men and material might enter. Men would experience no difficulty in working under the pressure required to expel the air, and would often be able to stop the leak when discovered.

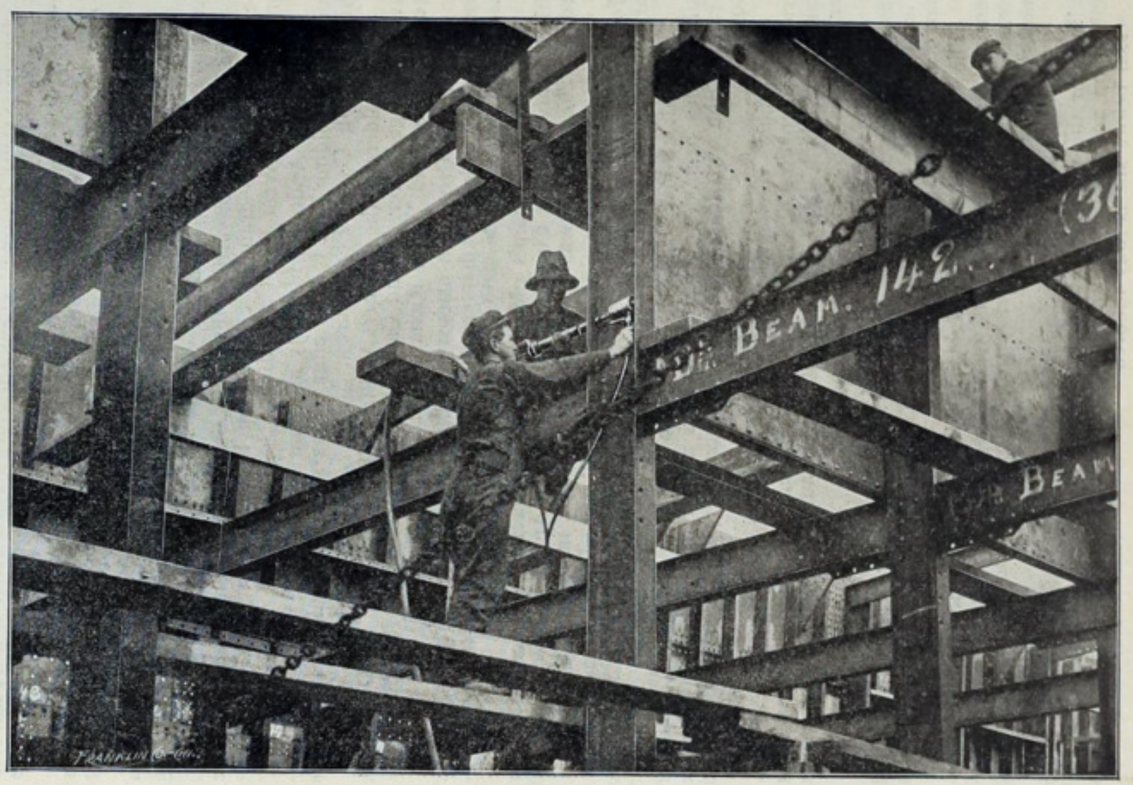
"Obviously the lesson which the incident of the hour should enforce is that the air compressor rather than the water pump should be employed, not merely for present emergency, but universally in ships as a cheaper and vastly more efficient protection. The use of compressed air for water expulsion should be provided for in the construction of the ship, especially in the staying of the decks and bulkheads, and in the construction of an occasional air-lock instead of single doors or hatches. No elaborate system of piping would be required, as air hose would be preferable and could be carried wherever wanted. The compressors would cost no more than the pumps which they would supplant. In the navy, where the employment of compressed air for auxiliary power transmission is still debated, this one use of the air should be an overwhelming argument for its installation."

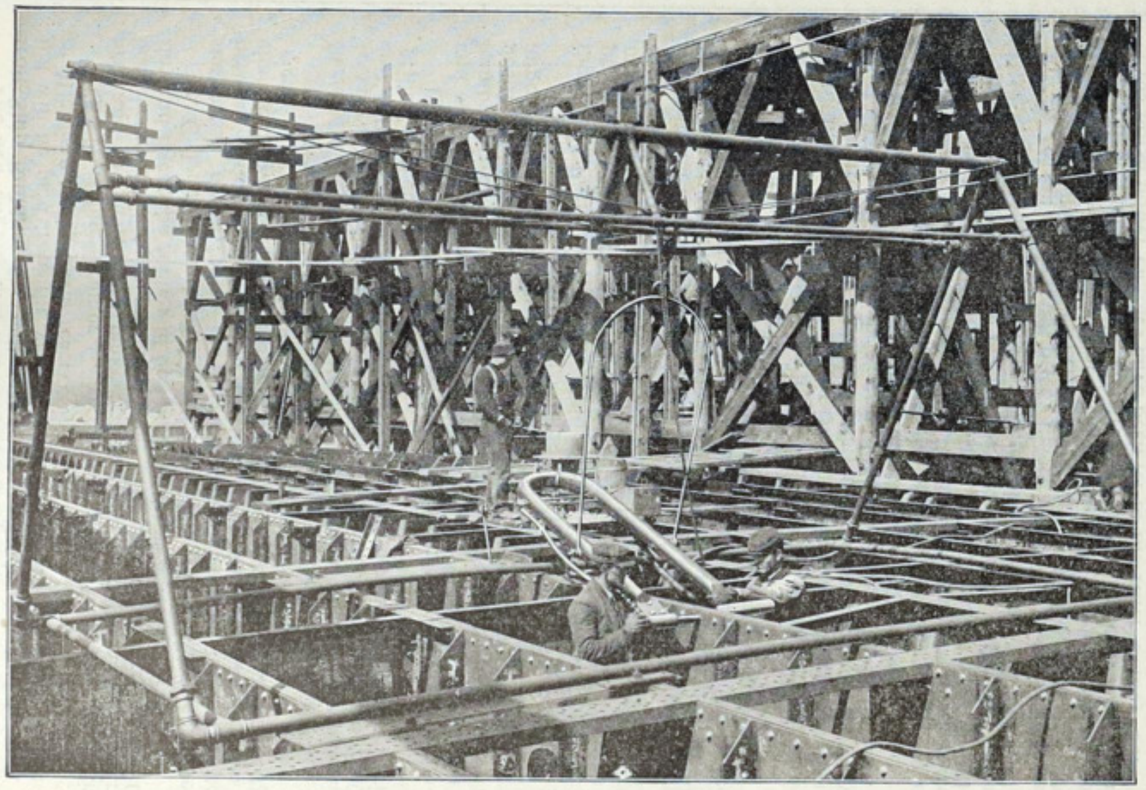
PENSACOLA'S CLAIMS AS A PORT.

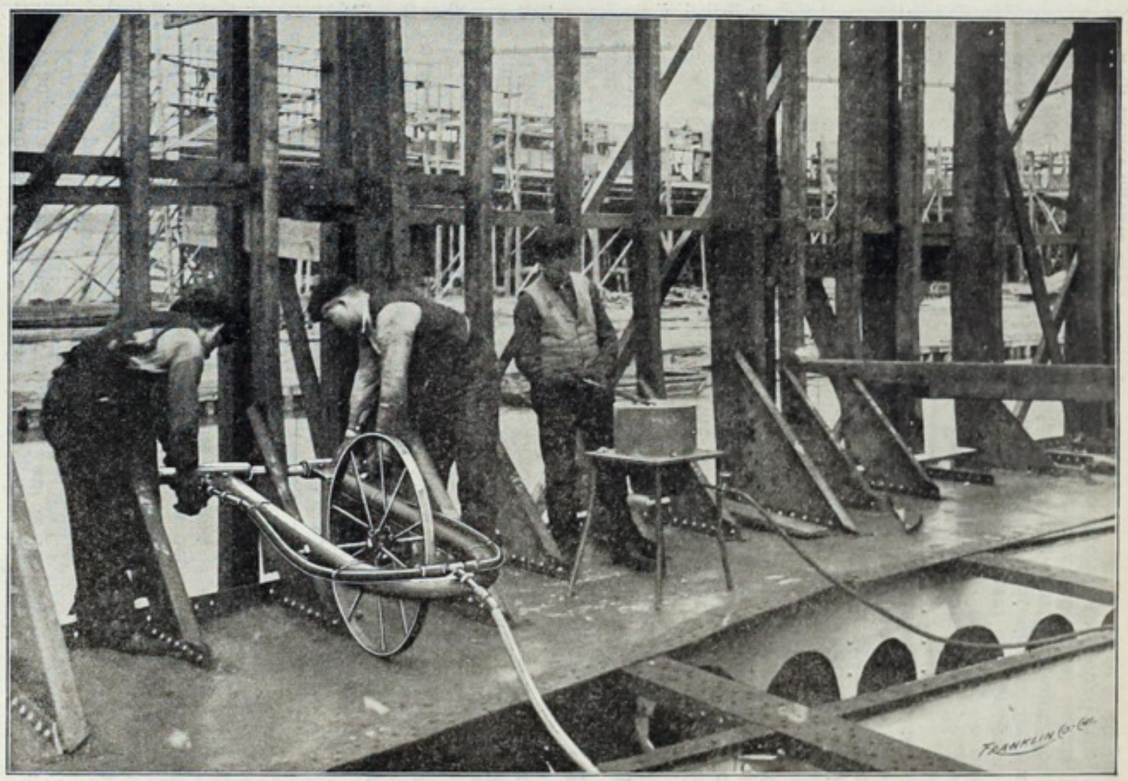
Pensacola, Fla., is rapidly assuming deserved prominence in the southern trade. The harbor itself is one of the best on the gulf, being land-locked and basin shaped. No efforts are being spared, however, to improve the shipping facilities, and dredging, which is now being actively carried forward will increase the harbor depth from 27 to 30 feet. Among the accommodations already at command is a coal dock that has a width of 120 feet and a length of 2,500 feet, with five tracks on the lower level and two on the upper level. Thirteen chutes for direct loading from cars on elevated tracks are provided so that two or three vessels can be loaded simultaneously from the chutes, while lumber and general cargo is being put aboard from the tracks on the lower level. Arc lights are furnished on all parts of the dock and work goes on day and night. In addition to the coal dock there is a steel dock 2,600 feet in length. Freight is delivered direct from vessels to cars, and the transfer of freight from an elevated track and platform is made without the heavy work of hoisting or any interference with deliveries below. A grain elevator recently erected has a storage capacity of 50,000 bushels and can deliver 20,000 bushels an hour, two vessels being loaded simultaneously.

The Ward liner Mexico, recently completed by the Cramps, made a most satisfactory showing on her trial a few days since. The Mexico, which is 385 feet over all, 50 feet beam and 32 feet 2 inches depth of hold, attained a speed of 20 miles an hour.









PNEUMATIC TOOLS IN THEIR APPLICATION TO SHIP YARD WORK AT CHICAGO. (Second Installment of Views.)

TOOLS MADE BY CHICAGO PNEUMATIC TOOL CO.

AROUND THE GREAT LAKES.

Ira M. Rose of Tonawanda, N. Y., has sold the tug Oneida to Joseph D. Kroop of that city.

A fleet of thirty park boats has just been completed at the Cuthbert ship yard at South Chicago.

The ice crushing car ferry Ste. Marie goes into dry dock at Detroit shortly for extensive repairs.

Underwriters sold the wreck of the steamer Harlem to the Thompson Towing Co. of Port Huron for $30,000.

Boats of the H. W. Williams Transportation Co. will carry United States mail between South Haven and Chicago.

Capt. Patrick Shea, who recently died at Buffalo, had been for ten years in the employ of the Western Transit Co.

The Wyandotte Pleasure Boat Works has completed a handsome little yacht for Dr. W. C. Lambert of Wyandotte, Mich.

The Graham & Morton Trans. Co. of Chicago has secured dockage facilities at Waukegan and will inaugurate a steamer service to that port.

The steamer City of Holland has had her engines compounded and will be sent to Chicago to go into dry dock before starting on her regular run.

John Stevenson of Detroit has chartered the steamer Miami to Capt. A. B. Slyfield of Port Huron to carry hardwood lumber from Traverse bay to Detroit.

Capt. E. Dunn of the Dominion cruiser Petrel reports that the wreck of the schooner Groton off Talbot point has been cleared away to a depth of 25 feet.

The Monarch Vapor Engine Co. of Grand Rapids, Mich., has leased the plant of the Wyandotte Boat & Oar Co. and will build vapor launches and pleasure boats.

Notice has been given by the light-house board that on July 1 a 10-inch steam whistle will be established at Calumet pier head (South Chicago) light station.

Charles H. Thorne, secretary of the Chicago Yacht Club, has purchased the 60-foot steam yacht Vailima, which is now enroute from Ogdensburg to Chicago.

A. G. Cuthbert, well-known Chicago yacht builder, has launched the Veva, which will compete in the preliminary trials to select a challenger for the Canada's cup.

Edward T. Peck, who was for twenty years engaged with the Detroit Dry Dock Co. in superintending the construction and repair of wooden vessels, has resigned.

William Hingston & Son of Buffalo have about completed work on the house boat Bohemian, which has been under construction at their yard since last autumn.

The Crosby Transportation Co. is reported to have paid the underwriters $1,300 for everything of value in the wreck of the steamer Lawrence at Frankfort, Mich.

About seventy positions at the St. Mary's Falls canal will be affected by President McKinley's order releasing a number of positions from the operation of civil service rules.

A sale of the steamer Tampa, which spent last winter on the rocks of Lake Superior, has been affected by the underwriters, but the name of the purchaser is not given out.

During the month of May the marine postoffice at Detroit delivered 25,639 pieces of mail to passing vessels. This is an increase of 2,132 pieces over the same month last year.

The work of converting the Juliet into a handsome yacht for the use of the Chicago drainage commission has been completed at Davidson's ship yard, West Bay City, Mich.

William F. Andrews, formerly assistant superintendent of the Cleveland Ship Building Co., is now engaged as superintendent for the Jenks Ship Building Co. at Port Huron, Mich.

Stockholders in the steamers William Chisholm and J. H. Devereaux have exchanged interests and Capt. William Gerlach will hereafter manage the former and W. C. Richardson the latter vessel.

Samuel H. Crowl, an attorney formerly associated with Harvey D. Goulder of Cleveland and later connected with the city law department, has opened offices at 425-426 Cuyahoga building, Cleveland.

Capt. J. S. Dunham's old schooner, the America, will celebrate her fiftieth anniversary at Chicago on July 4. The America, which is of 270 gross or 257 net tons, was built at Clayton, N. Y., in 1849.

The steamer Douglas Houghton, a duplicate of the Samuel F. B. Morse, building for the Bessemer Steamship Co., was launched at the yard of the Globe Iron Works at Cleveland, Saturday, June 3.

The old steamer Flora, belonging to the Lake Erie, Detroit River railroad, has been completely remodeled and her name changed to the Urania. She will go on the route between Cleveland, Port Stanley and Rondeau.

The officers of the Cleveland Steel Canal Boat Co. have had constructed a working model of the barge for carrying canal boats across Lake Erie which they expect to build this autumn. The model works perfectly.

The large steam scow, building for N. J. Gaylord of Ludington, Mich., was launched at that place several days ago. The scow is 72 by 24 feet and 8 feet deep and with several tons of machinery aboard draws less than 6 inches of water.

The steamer American Eagle, well known for her ice breaking propensities, is undergoing repairs at Sandusky which it is claimed will increase her efficiency in this direction. For one thing the bow is being cut away considerably.

The treasury department has issued to collectors of customs an order calling for the enforcement of the statute which provides for a fine of $200 upon any person who without permission from the master boards a vessel before she is fully moored.

The new engines and boilers to be placed in the Yantic by the Detroit Ship Building Co. will cost in the neighborhood of $10,000. The bill will be paid from the yearly allowance of $12,000 made by the State of Michigan to the naval reserves.

The Hart line steamer C. W. Moore has been leased to a Chicago firm and will henceforth make regular trips as a passenger and freight boat between Chicago and Kenosha. The Moore's place on the Green Bay and Escanaba route will be taken by the steamer Welcome.

E. C. Dunbar of the Northern Michigan company has chartered the steamer A. B. Taylor to Peter O'Connor of Chicago for season service between Chicago and Benton Harbor. The steamer America has been chartered to take the place of the A. B. Taylor in the Michigan City service.

B. W. Parker of Detroit, administrator of the estate of the late Capt. Bernard Wilds, has sold the steamer St. Paul to a company consisting of Joseph King, Irving W. Green, Capt. William McKay, John S. Quinn and William S. Eldredge, the first two being connected with Parker & Millen's office.

Capt. Thomas Jones, one of the best known ship masters on the lakes, and who was in the employ of the late Capt. Alva Bradley for a great number of years, has resigned command of the steamer Iroquois to take a position ashore with Mr. M. A. Bradley. Capt. Orville Green has been appointed master of the Iroquois.

A trust mortgage for $100,000 has been made by the Jenks Ship Building Co. of Port Huron to the Union Trust Co. of Detroit. All the vessel property of the Jenks company is covered. It is thought that this move means a more thorough equipment of the Jenks' works at Port Huron for the construction of steel vessels.

Another attempt is being made by Harbor Master Roberts of Chicago to have the city officials provide a patrol boat for service on the Chicago river. It is argued that such a vessel might be instrumental in securing greater efficiency from certain bridge tenders regarding whom many complaints have recently been made.

The passenger steamer R. G. Stewart, enroute from Hancock to Duluth, ran ashore on Michigan island, one of the Apostle group, at midnight, Saturday. At 10 o'clock Sunday morning she burned to the water's edge. The steamer, which is a total loss, was owned by Capt. C. O. Flynn of Duluth and insured through Duluth agencies for $6,000.

Capt. J. G. Warren, United States engineer at Milwaukee, has opened bids for the breakwater extension, harbor of refuge at Milwaukee Bay. The lowest bid was that of Robert B. Rice of Muskegon, Mich., $132,955. Other bids were Lydon & Drews Co., Chicago, $172,464; Samuel O. Dixon, Milwaukee, $161,451; Edward Gillen, Racine, $144,338.

By reason of the high price of steel and delay in delivery, it has been decided to build the great Peavey elevators at Duluth of wood. The elevators will have a capacity of 7,000,000 bushels, and 9,000,000 feet of lumber will be required in the construction of the buildings. Contracts for 1,700 horse power engines have been let to the Riter-Conley Co.

Cargoes recently loaded by the steamer Tecumseh and schooner J. I. Case consist of rock elms and oak timbers for shipment to England. The timbers, which are each about 60 feet in length, were moved from Wausau to Green Bay over the St. Paul & Northwestern railroad. At Kingston the lumber will be unloaded and rafted to Quebec where it will be put aboard ocean vessels.

Capt. E. J. Burke of the steamer Parks Foster says that a dangerous sandbar has formed in St. Clair canal cut. His steamer grounded there a few days ago, notwithstanding the fact that she was drawing but 17 feet of water, where there is supposed to be a depth of 18 or 19 feet. The place where the Foster went on the bottom is near the light-house on the upper end of the west pier, about 40 feet from the channel bank and well within the cut. Soundings after the release of the vessel showed a depth of 16 feet 8 inches.

AMONG THE MAGAZINES.

McClure's Magazine for June has a very entertaining article by its able staff writer Mr. Cleveland Moffett on Marconi and his wireless telegraphy. The inventor assisted in the preparation of the treatise which is a most comprehensive one. A readable account of a famous sea fight by Rev. Brady is also a feature.

Marine men will be interested in an editorial discussion in the current number of the American Review of Reviews of the problem "How to Make Ocean Navigation Safer." Considerable space is also devoted to the present rush to industrial monopoly.

The Review has already printed extracts from the excellent description of the naval repair ship Vulcan and its work which appears in this month's number of the Engineering Magazine. The marine and naval features of this publication have of late been especially creditable.

A sensation was created by the failure last week of Neilson Brothers of Glasgow, the largest dealers and exporters of ship plates in Scotland. It is calculated that the firm lost over $1,250,000 during the past year, chiefly by being heavily oversold when the rise in prices of iron and steel came.

New York shipping men are complaining vigorously of the lack of dry docks at the first port of the world. There are about forty dry docks in and about the harbor but with the exception of the two at the Erie basin few of them can accommodate vessels of great size.

OIL IN STORMY WEATHER.

That the old subject of the use of oil in stormy weather still possesses a considerable interest for a great many lake shipping men, is proven by the number of applications for copies of a circular letter on the subject recently issued by Lieut. W. J. Wilson of the Chicago branch hydrographic office. Lieut. Wilson's communication is as follows:

"Masters of vessels cannot be reminded too often of the use of oil in stormy weather. Its importance is well illustrated by the fact that it is now recognized in standard books on seamanship. The international marine conference at Washington recommended that the several governments require all their seagoing vessels to carry a sufficient quantity of animal or vegetable oil for the purpose of calming the sea in rough weather, together with suitable means of applying it. Thick and heavy oils are the best. Mineral oils are not so effective as animal or vegetable oils. Raw petroleum has given favorable results, but not so good when it is refined. Certain oils, like cocoanut oil and some kinds of fish oil, congeal in cold weather and are therefore useless, but may be mixed with mineral oils to advantage.

"As a general rule, probably the best way to use oil is by filling the wash bowls forward with oakum and oil, letting the oil drip out slowly through the waste pipes. Another simple and easy way to distribute oil is by means of canvas bags about one foot long, filled with oakum and oil, pierced with holes by means of a coarse sail needle and held by a lanyard. Running before a gale, use oil from bags at the cathead or from forward waste pipes; if yawning badly and threatening to broach to, use oil forward and abaft the beam on both sides. Lying to, distribute oil from the weather bow. With a high beam sea, use oil bags at regular intervals along the weather side. In a heavy cross sea, have bags along both sides. Steaming into a heavy sea, use oil through forward waste pipes. There are many other cases where oil may be used to advantage, such as lowering and hoisting boats, riding to a sea anchor, crossing rollers or surf on a bar and from lifeboats and stranded vessels."

Lieutenant Wilson, who has devoted twenty-five years to the study of seamanship and nautical science, is enthusiastic in advocating the more general use of oil to quiet the waves of the great lakes. "If the captains could be made to understand the many advantages offered by the proper use of oil in rough weather and in case of accidents, there would not be a boat leave this port without a supply of oil and the necessary equipment," he said. "The application of the fluid to quiet the waves is no longer an experiment. It is a positive success. Within a few years all the captains will, I think, use oil as a safeguard. The cost is comparatively small, and there is no reason why it should not come into general use on the lakes. I could recall a dozen cases where the timely use of oil saved boats and their crews. The effect of oil dripped from a boat in a rough sea is not generally understood by landsmen. Some people seem to think that huge mountains of water should be instantly calmed by the application of oil. Of course, that is not expected. The oil quiets the waves to a certain extent and prevents them from breaking over the craft. When oil is used the waves, instead of crashing over the deck, and in extreme cases tearing away the cabin, demolishing the hatches and flooding the boiler-room, come in long swells and are thus rendered less harmful."

PROGRESS IN THE ART OF MAKING CATALOGUES.

The past decade has witnessed a great advance in the art of catalogue making, particularly in the machinery trades. The modern catalogue must not only be attractive—and this seems to have been the sole idea in some recent publications—but it must above all serve in the best manner possible its primary purpose of furnishing information. Illustrations must be clear, explanations explicit, and all information concisely given. The substantial character of most machinery demands similar character in the make-up of the catalogue describing it. Bold, clear type, black ink, good cuts, simplicity in composition and first-class paper of good weight, all have a subtle influence in impressing the reader with the idea of the high quality of the article described.

An excellent example of good catalogue making, in which this is the controlling idea, is presented by the B. F. Sturtevant Co. Their publications are of two classes. First are those purely educational in their character, comprising treatises on various subjects, leaflets regarding the attendant advantages, etc. Second are the regular trade catalogues of the standard dimensions, 6½ inches by 9 inches, each devoted to a specific line of manufactured goods. Separate catalogues in the same class bear the same cover design, but are printed and bound in different colors with proper titles, so that they may be readily distinguished. All catalogues are designated by individual numbers, the latest being No. 110. The most recent products are immediately presented by bulletins (designated by letters) preliminary to the issuance of complete catalogues regarding the given machines. Loss of time is thereby avoided and the new designs can be sooner placed before the public.

FOR AN AMERICAN MERCHANT MARINE.

The efforts of Senator M. A. Hanna, author of the well-known shipping measure of the last congress, toward securing from the Trans-Mississippi Commercial Congress which recently met at Wichita, Kas., a plea for the upbuilding of the American merchant marine, bore excellent fruit. The congress after a spirited debate passed by a decided vote the following resolution:

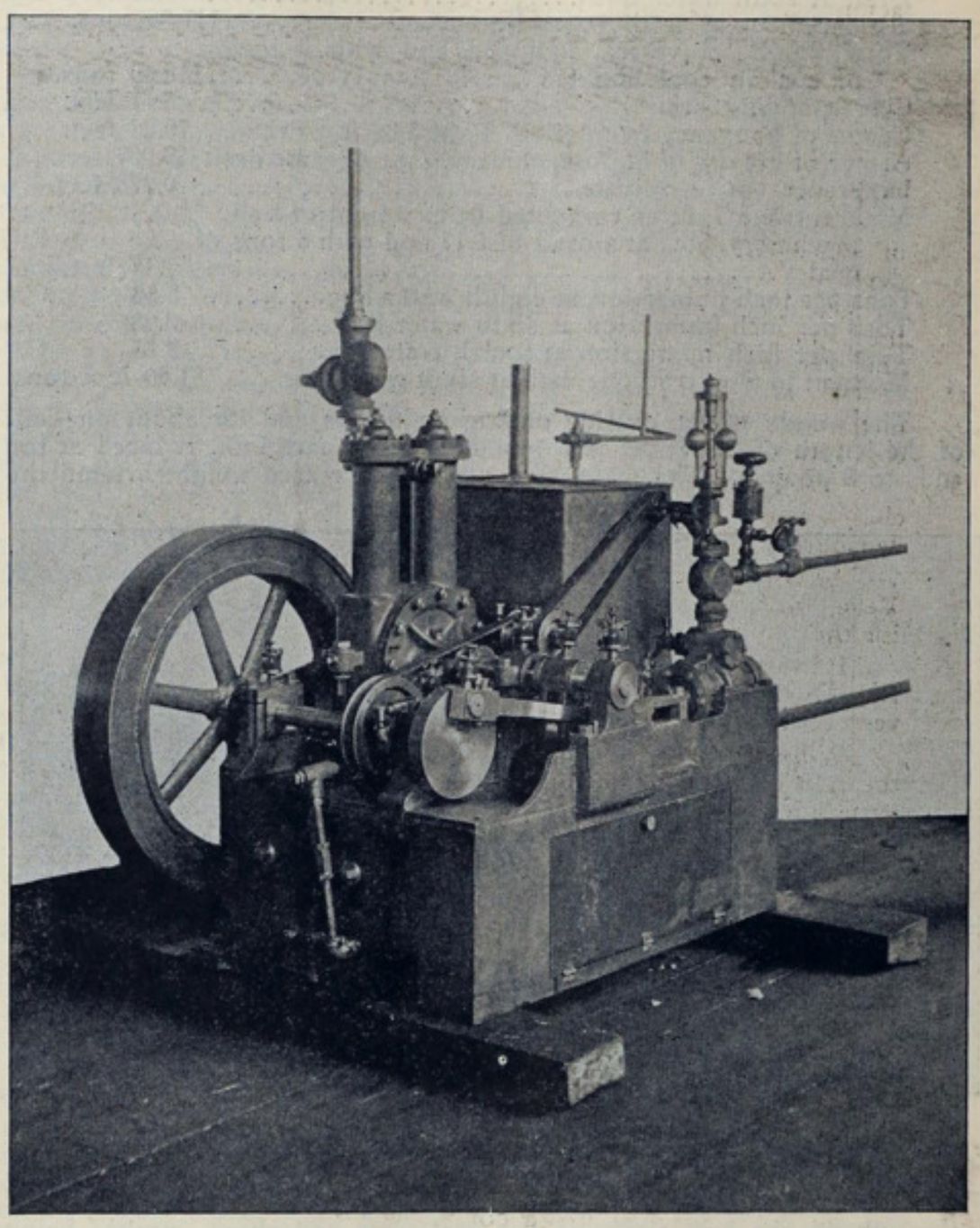
"Whereas, the interests of the whole country, the reinforcement of our navy, the enlargement of foreign markets for our surplus products, the increased employment of our working men in the mine, foundry, factory and ship yards, and the training of able seamen would all be promoted by the restoration of our merchant marine to its former position on the seas of the world; therefore,

"Resolved, that in our opinion it is the duty of congress, at the earliest day possible, to enact legislation to secure such restoration by the payment of subsidies to American-built mail carriers and freighters sufficient to enable them to successfully compete with the subsidized and bountied merchant ships of foreign countries in the carrying of our imports and exports."

REFRIGERATING MACHINES FOR FREIGHT VESSELS.

A refrigerating plant for a freight-carrying vessel on the great lakes is something new. Up to a short time ago all refrigerating machines on the market were either too expensive or the cost of operating them too much to warrant their installation on vessels of this class. Last week there was tested at the works of the Automatic Refrigerating Co., 972 Hamilton street, Cleveland, a refrigerating plant of the A. T. Ballantine patent, which was built especially for the steamer Presque Isle and on which it will be installed in a very few days.

The machine, which is illustrated herewith, is operated by steam from the regular boiler supply of the vessel, through a one-inch pipe. It is very simple in construction, consisting merely of a small steam pump and a condensor—requiring 1½ horse power to run it—and an automatic governor for regulating the expansion of the ammonia, permitting the expansion just at the time and to just the extent that is required in the work the machine is called upon to do. This governor is the paramount feature of the machine, for with its weight properly set and the power



turned on, no further attention is required to any part of the machine, except to see that the bearings are kept properly oiled. In the case of the Presque Isle, where the amount of steam necessary to furnish 1½ horse power will hardly be missed, the cost of operating the refrigerating plant will be almost nothing. The Ballantine machines are made for either steam, electric or water-motor power.

About ten pounds of ammonia is necessary to charge the Presque Isle's machine. The ammonia is condensed to about 125 pounds pressure and enters the storage box with a pressure of about 15 pounds. It is this expansion which takes the heat from the box. The pump and condenser occupy a floor space of about 27 by 36 inches, and are about 36 inches in height. Almost any size of a storage box can be used. At the test made last week a storage box 8 by 2½ by 7 feet was used, and although the box was in very poor condition a temperature of 34 degrees was reached in two hours. In order to test the extreme freezing capacity of the machine, it was allowed to run, wide open, for seven hours, when the thermometer in the storage box registered seven degrees below zero. By adjusting the regulator the temperature of the box can be held at any point for an indefinite period. The Presque Isle machine has a refrigerating capacity equal to that of 1000 pounds of ice per day. If used as an ice machine it will make 500 pounds in twenty-four hours.

The Lidgerwood Mfg. Co., New York, manufacturers of improved hoisting engines and suspension cableways, has recently established a branch at Atlanta, Ga., with offices in the Prudential building. This is the finest office building in Atlanta, if not indeed in the entire south. The Atlanta branch will be in charge of Mr. J. H. Dickinson, C. E., sales agent.

Mr. Oscar Phelps Austin, chief of the bureau of statistics, treasury department, was in Cleveland, a few days ago, on his way up the lakes. Mr. Austin is endeavoring to locate the cause of differences of exports as reported by collectors of customs in the districts bordering on Canada and imports from these districts as returned by government officials in Canada. He will also inquire into certain features of the coasting laws as applied to the great lakes which stand in the way of satisfactory compilation being made of lake commerce.

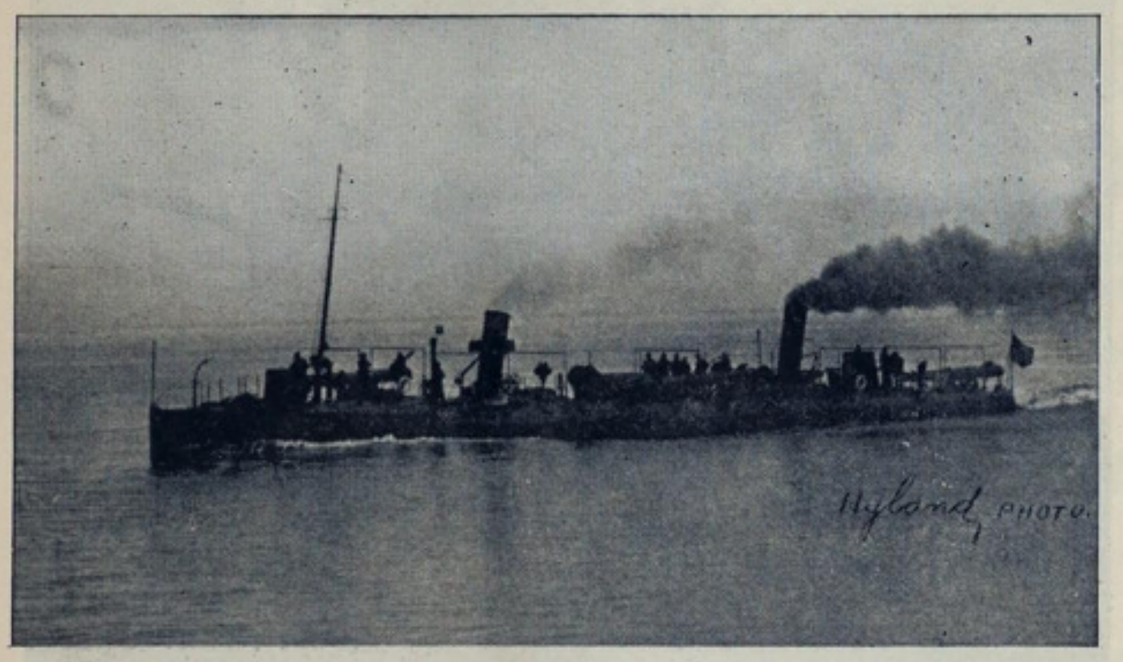
TORPEDO BOAT FOX.

A PRODUCT OF THE WOLFF & ZWICKER IRON WORKS, PORTLAND, ORE., WHICH EXCEEDED CONTRACT SPEED BY ALMOST A KNOT ON THE FIRST OFFICIAL TRIAL.

The picture herewith presented represents the torpedo boat Fox, recently built by the Wolf & Zwicker Iron Works, Portland, Ore., running at a speed of almost 23½ knots. The Fox on her official trial exceeded her contract speed of 22½ knots by 91-100 of a knot, which constitutes in the belief of the builders the first instance in which a torpedo boat has exceeded her contract speed on a first official trial. Dimensions of this vessel are as follows:

Length over all	146.00 feet.
Breadth, extreme, on frames	15.30 feet.
Breadth, at sixth water line	14.60 feet.
Depth from base line to top of beam at side	8.00 feet.
Draft at sixth water line	5.32 feet.
Displacement at sixth water line	117.00 tons.
Total weight of vessel, equipped and with 6 tons of coal in coal bunkers	110.40 tons.
Corresponding draft	5.17 feet.
Center of bouyancy from aft P. P. at 5.32 feet draft	70.22 feet.
Center of gravity of hull, machinery, etc., at same draft	69.997 feet.
Difference (to be adjusted)	0.223 feet.
Metacentric height as computed from weight of hull, machinery, etc., at a draft of 5.17 and with 6 tons of coal	2.17 feet.
Tons per inch immersion at eighth water line	3.53
Tons per inch immersion at sixth water line	3.23
Tons per inch immersion at fourth water line	2.55
Moment to alter trim one inch at sixth water line	31.00 foot-tons.

The weight of the outside plating amidships and for about one-half of the length of the vessel is 7½ pounds per square foot, reduced at the ends to 5 pounds. The plate, of course, of increased weight around the



U. S. TORPEDO BOAT FOX MAKING 23½ KNOTS.

stern tubes and elsewhere. The plating is lap joined and double-riveted throughout, the butt straps in the keel plate and sheer strake being treble-riveted. The weight of bulkhead plating is 4 or 5 pounds. The outside plate of the deck weighs 7 pounds, being 4 feet wide amidship, and is reduced to 5 pounds at the ends. The conning towers contain steering wheels, telegraphs, binnacles, speaking tubes and other fittings.

Cabins and living quarters and the joiner work for lockers, berths, etc., are of white pine and Port Orchard cedar. The crew space has twelve folding berths. Particular attention has been given to the ventilation of the vessel by means of cowls, so arranged as to form downcasts and cowls.

The Fox is fitted with two vertical four-cylinder triple-expansion direct-acting surface-condensing engines, with one cylinder 11⅞ inches, one 19 inches and two 22⅞ inches in diameter and 15 inches stroke. The engines are estimated to develop 1,750 horse power when making 395 revolutions. All valves are piston valves, there being one for the high pressure cylinder and two for the other cylinders. The engines are borne by forged steel columns, trussed by forged steel stays. The bedplate is of steel plates. The engine foundation is built strongly of steel plates and bars. The valves are worked by means of cranks on a shaft parallel to the main engine shaft and geared to that shaft. The condenser has a cooling surface of about 1,400 square feet, measured on the outside of the tubes, and one single-acting independent air pump is fitted for each engine. Propellers are of maganese bronze.

Boilers are of the water tube type. Each fire room has a blower discharging into the fire room. There are two boilers of sufficient capacity to develop 1,800 horse power under forced draft. The working pressure is 250 pounds. The grate surface is about 45 square feet on each boiler, and the ratio between grate and heating surface is 1 to 55. The smokestacks are 18 feet in length above the grate. The main feed pump is of the vertical, single-acting plunger type, driven from the main shaft. The auxiliary feed pumps have a capacity of 50 gallons per minute and are so connected as to draw from the sea, feed tank, bilge or boilers as desired, and they will deliver into the fire main, feed pipes or overboard. The blower engines are designed for a working pressure of 150 pounds. The distilling apparatus has a capacity of 900 gallons in twenty-four hours.

The Wolff & Zwicker Iron Works is also building the torpedo boat Goldsborough, and there is every reason to expect that she will duplicate the favorable record made by the Fox. The Goldsborough will, barring accidents, be launched on July 4.

POWER CANAL AT THE SAULT.

A LETTER ON THE SUBJECT FROM MR. FRANK J. FIRTH, PRESIDENT OF THE LAKE CARRIERS' ASSOCIATION.

Although the Michigan-Lake Superior Power Co. is going ahead with the construction of a power canal at Sault Ste. Marie contrary to recommendations of a board of army engineers appointed to inquire into the company's canal plans, President Frank J. Firth of the Lake Carriers' Association, who has given some attention to the project, says that personally he has no doubt whatever of the ability of the company to operate the canal and fully protect lake navigation interests by the construction and permanent maintenance of proper remedial works. Answering inquiry from the Review as to what attention was being given to the matter by the Lake Carriers' Association, Mr. Firth says:

"I received from the secretary of war a copy of the report of the board of engineers to Brig. Gen. John M. Wilson, chief of engineers United States army, Feb. 23, 1899, on the 'Soo' power canal, together with a copy of the letter addressed by the secretary of war to Mr. E. V. Douglas, president of the Michigan-Lake Superior Power Co., March 22, 1899, reading as follows:

" 'Referring to your application for permission to construct certain works in the St. Mary's river, and a canal which shall tap the waters of Lake Superior near the mouth of said river in the State of Michigan, I have to advise you that under your express statement that the works you propose will not, under the plan contemplated, impair or obstruct the navigability of any waters over which the United States has jurisdiction, it is not necessary for this department to grant you permission or license to execute the works. The permission of this department is only necessary in cases where proposed works will alter or modify the condition or capicity of the lake or the channel of any navigable water of the United States, which, under your statement, will not be done by the execution of your proposed plans. If you are correct in this statement, then you need no permission from this department to proceed with your works.'

"I have had an interview with Mr. Douglas upon the subject and he authorizes me to say that the Michigan-Lake Superior Power Co. will not take any water from Lake Superior into the canal they are constructing at Sault Ste. Marie until they have completed remedial works in the rapids acceptable to the United States government and to the Lake Carriers' Association as fully protecting lake navigation interests against any possible lowering of the lake levels by the withdrawal of water from Lake Superior to supply the power canals upon the United States and the Canadian sides of the rapids. I have, personally, no doubt whatever as to the ability of the company to operate their canal and fully protect lake navigation interests by the construction and permanent maintenance of proper remedial works.

"Questions affecting the lake levels are of such vital importance to all lake vessel owners, both in the United States and Canada, that the Lake Carriers' Association should, in my judgment, cordially endorse and advocate the formation of a competent international commission composed of representatives of the United States and of Canada to consider and decide upon rules to govern all such enterprises as the 'Soo' power canal; the 'Soo' locks; the Chicago drainage canal; the Niagara power canals, etc. All such enterprises, if allowed to exist, should be under rigid rules for their operation including the construction and maintenance of remedial works, so that there should be no possible interference with navigation interests under any circumstances."

LAUNCHING THE COLUMBIA.

Ship builders will, no doubt, be interested in the method to be followed at the yard of the Herreshoff Manufacturing Co. at Bristol, R. I., in launching the yacht Columbia, the prospective defender of the America's cup in the international races next October. A dispatch from Bristol referring to the launching says:

"Every precaution will be taken to make it perfectly sure that no mishap will befall the boat. The launching will be different from the launching of other cup defenders, from the fact that this vessel was built on a launching cradle. All it will be necessary to do will be to slacken the connecting cable that holds the cradle to the purchase drum. The cradle is fitted with heavy wheels of small diameter, running on steel rails, and these latter extend quite a distance out into the channel. The cradle will run along the rails as long as the weight of the boat is bearing on it, but when that bearing down ceases the boat is afloat for the first time. She will then be hauled alongside the wharf to be rigged, where there is a channel with a depth of nearly 24 feet at low water. Much delay has been occasioned in adjusting the stern piece. Its elliptical shape and slightly curving outline consumes considerable time in getting the exact fit. The bolting on was another slow job, but when once entirely completed it will give the yacht a fine appearance. It resembles the stern piece of the Defender very much, although not as deep. The work of planking the deck is nearly completed. The caulkers have started to work on the forward end of the boat. Following close after the men laying the deck planks are a number of other carpenters fitting and fastening the hatch coamings in their places. These latter are formed of light wood."

The twin-screw steamer Pennsylvania, building at the Roach yard, Chester, Pa., for the New York, Philadelphia & Norfolk Railroad Co., was designed by Gardner & Cox, well-known naval architects of New York city and will embody the flat stern which the designers some years ago introduced in the Feiseen, which was sold for torpedo boat service to the Brazilian government. The only other large vessel of this type of construction is the English channel steamer Teisme. It is claimed that a stern of this type will prevent the boat from settling by the stern at high speeds and will also insure the propellers being submerged at all time. The vessel now building is 260 feet in length, 41 feet beam, and 9 feet 6 inches draught. She is to maintain a speed of 20 miles and is fitted with four-cylinder triple-expansion engines, to which steam will be supplied from six Almy water tube boilers.

LA GRANDE DUCHESSE.

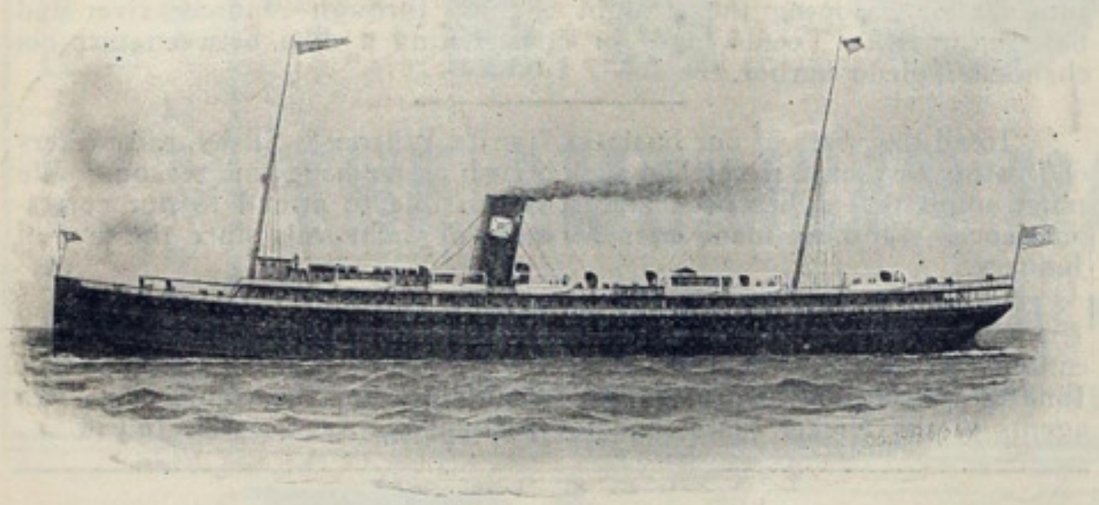
THE PALATIAL PLANT LINE STEAMER WHICH WILL HEAD THE PLEASURE FLEET AT THE INTERNATIONAL YACHT RACES OFF SANDY HOOK.

Vice-president and Manager M. F. Plant of the Plant line announces that his company has decided to run the magnificent steamer La Grande Duchesse to the international yacht races beginning Oct. 3. The bookings of staterooms and passages already made at the Plant offices at 290 Broadway indicate that the capacity of even this commodious vessel will be taxed.

The Grande Duchesse, which is in service this summer on the route between Boston, Halifax and Charlottetown, is built entirely of steel and is of the following dimensions: 404 feet long over all; 380 feet between perpendiculars; 47 feet 9 inches beam; 37 feet 4 inches deep from top of deck to base line. She is fitted with two steel masts fore-and-aft rigged. Her water bottom extends from stuffing box bulkhead to collision bulkhead. Decks and houses are all of steel; The stern and rudder frames are made of cast steel, and the rudder stock of the best fluid compressed steel, manufactured by the Bethlehem Iron Co. The steering gear is a steam apparatus operated by a telemotor; also a heavy Napier steering gear. The vessel is fitted with a "Providence" steam windlass and capstan and Williamson Bros.' hoisting engines for handling cargo, and in addition thereto has steam elevators in two of the hatches.

On the main deck forward is the dining saloon, with a seating capacity for 125 people. The room is handsomely fitted up and decorated in white and gold. Forward of the dining room is a reception room, forward of which are sleeping accommodations for passengers. In the after end of the dining saloon is a grand stairway leading to the social hall above.

On the main deck aft of the dining saloon is a pantry, and aft of this is the large galley. On this deck are located cold storage for provisions, officers' mess room, baker and porter shop, telephone exchange room, stewardess' room and a number of sleeping rooms abreast of the boiler



PLANT LINE STEAMER LA GRANDE DUCHESSE.

and engine hatches for oilers, water tenders, etc. Aft of the machinery is the main saloon with two tiers of state rooms on each side. In the forward end of this saloon is the grand stairway leading to the social hall. Immediately aft of the main saloon are toilets, bathrooms, etc., for ladies and gentlemen. In the forward end of the upper or promenade deck is a social hall for second-class passengers, finished in quartered oak, with a stairway leading to the dining room. The social hall has quite a number of state rooms leading from it for first class passengers. On the extreme upper deck forward is the pilot house, aft of which is the captain's room and two tiers of state-rooms continuing to the smoke stack. Over the social hall aft is a large steel house, fitted up as ladies' observatory.

The vessel is equipped with twelve life boats, six life rafts and the necessary life preservers, etc., and in fact everything necessary for the safety of passengers and crew. There is also a complete ventilating system connected to all parts of the ship, including state-rooms, and a fire alarm system. Two generators, direct driven, furnish electric lights everywhere on the vessel and also supply a search light.

The machinery of this steamer consists of two inverted, direct acting surface condensing, quadruple expansion engines, driving twin screws. Wheels are of manganese bronze. The total horse power is 7,000. Steam is supplied by eight boilers built for a working pressure of 250 pounds. One large smoke stack gives the ship a very trim appearance. Blake pumps are used for ballast, bilge, sanitary, fire and feed purposes. Unusual precaution has been used in every part in the construction of this vessel for the safety and comfort of passengers. She has accommodations for 500 first-class and 200 second-class passengers. La Grande Duchesse was designed in compliance with United States government requirements for auxiliary cruisers.

A CHANGE IN BY-LAWS.

At a recent meeting of the council of the American Society of Naval Engineers it was decided to submit to the members of the society the following proposed change in the by-laws, made necessary by the amalgamation of the line and engineer corps of the navy by the personnel bill, in order that the by-laws may be consistent with the continuance of the association. Accordingly it is proposed to now have Article 5 read in future as follows: "Officers of the line and construction corps and ex-officers of the engineer, line and construction corps of the navy, and ex-officers of the revenue cutter service shall be eligible as members." A notice of this proposition was forthwith mailed to each voting member and so far the returns have indicated an almost unanimous approval. The changes in official titles made by the personnel bill will at once be adopted in all correspondence and transactions of the society.

AMERICA'S CUP RACE.

ENGLISH COMMENT ON THE CONDITIONS TO BE MET BY THE BRITISH CRAFT IN THE COMING INTERNATIONAL YACHT CONTEST.

An English view of the conditions governing an international yacht race is always interesting, and no exception need be made in the recent expressions of the editor of Syren and Shipping of London, who, although he disavows all intention to be pessimistic, expresses the conviction that the America's cup will probably remain on this side of the Atlantic for some time to come. "It is obvious," continues the article, "that an English yacht competing in American waters is heavily handicapped, by reason of the all-important fact that she has to voyage across the Atlantic, and must therefore be built so strongly that she will make the voyage without unduly straining hull or spars. But the provision of this necessary strength means an increase of weights that materially prejudices her chances of success when competing with a lighter craft specially designed and built for sailing in comparatively light airs and calm water. Without doubt the great disability under which English craft labor is geographical. The eastern seaboard of the United States, like England, enjoys a predominance of westerly winds, with the natural result that while we experience the rude biasts which have gathered strength and the companionship of heavy seas during their passage across the Atlantic, American yachtsmen can pursue their craft in waters sheltered by the land. Thus weather conditions have tended to the evolution of a British yacht, which shall be, first and foremost, a good stout sea-boat, and when we add to this inherently heavy type the additional strength necessary to enable a boat to make a voyage across the Atlantic, it is plain that choice of ground means everything, or nearly so.

"This year, Sir Thomas Lipton has thrown himself into the breach, and proposes to accomplish, by means of his Shamrock, what other British yachtsmen have failed to do. As to the chances of success, they are extremely problematical. In addition to the handicap of greater weight of hull, there are the unfavorable conditions under which the race will be sailed to be considered. Knowledge of water counts for much, and there are other abnormal conditions. It is one thing to navigate a yacht over an uninterrupted course, but quite another thing to do so with the perplexing accompaniments of fleets of mammoth excursion steamers, whose occupants insist on being taken as close to the competing boats as possible, without collision with them. This interference with wind and water is a matter which British yachtsmen find it hard to understand, for it is hardly within the bounds of possibility for a Yankee holiday crowd to be so chivalrous as to ensure that the competing craft will be hampered in their movements impartially. The rumor has gone forth that the Shamrock is to be towed across the Atlantic, but this is hardly practical, as the strain of towage would more thanequal that of a voyage under sail, thus rendering it impossible to secure a lighter vessel by the adoption of such means of making the ocean trip. It is a wonder, considering the fact that so much importance is attached to the necessarily greater weight of a British yacht designed to sail in American waters, that the plan of having a boat built in Canada has not been followed. She could, of course, be designed here, and her several parts put together on the other side. The sending across of skilled workmen would, naturally, entail extra expense, but then, expense is no object with a sportsman who would bring the America's cup back to England. Such a plan seems to be the only one by which the disadvantages of building a strong, and therefore weighty, hull can be overcome. The yacht would still be British, and we know of nothing that would disqualify a boat, constructed on these conditions, from competition for the cup. However, it is reassuring to know that everything which might conduce to lightness has received the anxious consideration of both designer and builder, and hence it is not expecting too much to hope that Sir Thomas Lipton's craft will, at least, give as good and probably a better account of herself than her predecessors. It is not long now before the Americans will have held the cup for fifty years, and it would be a fitting wind-up to the triumphs of British ship builders could we, in the closing years of the century, beat the Yankees at their own game of designing, building, and sailing a fair-weather yacht."

INLAND WATERS OF CANADA.

At a recent meeting of the Canadian Society of Civil Engineers Mr. George H. Webster read a paper on "The Inland Waterways of Northwestern Canada," which bore evidence of careful preparation. The paper offers a solution of the problem of the stimulation of Canadian trade in grain and other commodities. Mr. Webster says in part:

"Is there no way of reaching a solution of a difficulty, one that will lead to a general lowering of freight rates between points far west of Winnipeg and the lakes?" The writer ventures to say that there is, and that this solution is to be found in the development of navigation on the numerous rivers and lakes between Lake Superior and the far west; in other words the writer believes that a magnificent system of waterways is capable of being opened, at a reasonable cost, that will reach from the lakes to the farthest bounds of the rich prairies of Manitoba and the territories. We have been singularly favored in possibilities in this respect. Probably no such extensive territory in the world, apart from the St. Lawrence and Mississippi valleys, is possessed of such advantages for furnishing cheap transportation facilities as our vast prairie stretches. A most important feature, at the same time, in connection with these rivers and lakes is that they are all located on the line of our domestic and export traffic routes. The distance from Buffalo to New York is 504 miles and from Winnipeg to Fort William 453 miles. The former consists of 350 miles of contracted canal and 154 miles of deeper and wider water in the Hudson river. The latter consists of only 148 miles of contracted canal and 305 miles of deep rivers and lakes; but the advantage which this gives to the Winnipeg-Lake Superior route in sailing time over the Erie will be partly counterbalanced by the increased lockage of the former. It will be fair, then, to assume that the time required by a four-boat fleet to make the round trip between Winnipeg and Fort William will at least not exceed that required between Buffalo and New York."

ITEMS OF INTEREST.

On a recent trial the steam yacht just completed for J. Pierpont Morgan attained a speed of 17 miles an hour, her engines making 170 revolutions per minute. The yacht will not go into commission until June 14.

The Brown Hoisting & Conveying Machine Co. of Cleveland will in the near future export a 300-foot cantilever crane to a steel concern at Liege, Belgium. The shipment, which will consist of six car loads, is valued at $40,000.

The board of bureau chiefs of the navy have decided that the six new cruisers for which specifications have just been prepared shall be equipped with electrical plants for all secondary machinery, including the winches and windlasses.

Seven hundred men embracing the employes of all the leading Baltimore ship yards have been involved in the strike inaugurated there last week to enforce a request for a reduction in the hours of labor from ten to nine with no decrease in pay.

The United States cruiser Brooklyn was severely damaged, a few days ago, by running on an obstruction in New York harbor, only a short distance from that on which the battleship Massachusetts struck some time ago. An examination of the Brooklyn after the accident showed that part of the vertical keel had buckled, that the cement had cracked and that rivets had been started all along the plates from the forward to the after magazine.

The Chesapeake & Ohio railroad has been given authority in court at Newport News to dispose of the coal barges Mystic Belle, Ocean Belle and Chalmette, three vessels which formerly belonged to the Atlantic Transportation Co. of New York, the corporation which chartered so many lake vessels for coast service. The foreclosure was authorized by reason of the fact that the Atlantic company had paid but $7,500 on notes for $50,000 held by the C. & O. company.

The International Navigation Co. has abandoned to the underwriters the American liner Paris, stranded off the Cornwall coast. The ship is insured for $1,000,000, divided among forty companies, fifteen of which are in New York City. It is understood that the underwriters will, after one more effort to release her, make arrangements to break up the vessel. The cargo recovered from the Paris is valued at $242,000, and it is understood that the salvage claim will amount to one-third of this amount.

The board on life saving appliances has just made a report regarding its findings at a series of meetings recently held at Boston. One of the new devices with which the board was favorably impressed is a type of life-saving buoy made from reindeer hide, and a test will be made on Lake Huron. This material is said to be equally buoyant whether wet or dry and it is more durable than cork. The board decided to adopt a rope throwing device as a part of the regulation life saving paraphernalia. This consists of a gun for throwing a rope over a wreck and is so light that it can be adjusted for use from a life-boat.

Everybody who has seen the rebuilt steamer Arthur Orr, which was wrecked on Lake Superior last fall, but soon released from the beach and repaired during the winter at the works of the Superior Ship Building Co., pronounces her a far better and stronger vessel than she was before the accident. The Orr is not so squatty in appearance since she was lengthened 47 feet. She was given a double sheer stroke, and this, with channel girders on the sides and all damaged material ripped out and made good, has greatly stiffened the vessel. The owners of the Orr, C. W. Elphicke and others of Chicago, settled with the underwriters by taking her back after abandonment at an agreed price. The work of rebuilding her involved an expenditure of probably $50,000.

"The Influence of Mechanical Draft Upon the Ultimate Efficiency of Steam Boilers" is the title of a paper, highly valuable to all steam users, which was recently read before one of the leading engineering societies of the east by Mr. Walter B. Snow of the engineering staff of the B. F. Sturtevant Co., Boston, Mass. The paper has been reprinted with illustrations in neat pamphlet form and it is understood copies may be obtained on application to the Sturtevant company.

Mr. Edward Robinson, proprietor of the Wells light, 44 and 46 Washington street, New York, returned from England on the steamer Umbria a few days ago, after a very pleasant trip, taken partly in the interest of the Wells light business and partly for pleasure. During his absence abroad, 1500 of the now famous Wells lights were sold to the Russian government, for use upon their railroads in that country.

Proposals for harbor excavation at Erie, Pa., will be opened by Major T. W. Symons, United States engineer, Buffalo, on June 26. Col. Jared A. Smith, United States engineer at Cleveland, will open bids June 30 for dredging the straight channel through Maumee river and bay, entrance to Toledo, and for constructing a dike between turn-out channels Toledo harbor.

"In all the years of our business," write Wilson & Silsby, sail makers of Boston, "we have never had such a rush as we have this season. We must admit that it has been almost impossible to attend to our correspondence. We have made over 200 suits of yacht sails since the first of January."

Nickel Plate road excursion to California account of National Educational Association convention at San Francisco, Cal.—Tickets on sale June 24 to July 7. One fare, plus two dollars, for the round trip. Ask agents of the Nickel Plate road for particulars. 44, July 6.

U. S. Engineer Office, New Orleans, La., May 30, 1899 Sealed proposals for furnishing steel or iron Tug-boat about 90 feet long, with compound engines, will be received here until 11 a. m. June 30, 1899. Information furnished on application. Geo. McC. Derby, Major, Engrs. June 22.

U. S. Engineer Office, Duluth, Minn., June 6, 1899. Sealed proposals for building extension to breakwater at Presque Isle Point, Marquette, Mich., will be received here until noon, July 6, 1899, and then publicly opened. Information furnished on application. Clinton B. Sears, Major, Engrs. June 29.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., June 8, 1899. Sealed proposals for Removal of part of Wreck of Steamer Horace A. Tuttle at Michigan City Harbor, Ind., will be received here until 3 p. m. July 8, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 29.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., June 8, 1899 Sealed proposals for Crib work and Repairs to Government Piers at South Haven, Mich., will be received here until 3 p. m. June 23, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 15.

S. R. Kirby of New York is the inventor of a simple but valuable device known as the Kirby transformer, a slide rule for converting the arc of a circle into corresponding time and vice versa. The transformer will serve as a useful rule for checking nautical and astronomical calculation in general. It will especially interest those concerned in navigation and will prove a valuable help to young students of nautical and astronomical matters.

U. S. Engineer Office, 185 Euclid Ave., Cleveland, O., May 31, 1899. Sealed proposals for dredging in Straight Channel through Maumee River and Bay, and for Constructing Dike between Turn-out Channels, Toledo harbor, Ohio, will be received here until two o'clock, P. M., standard time, Friday, June 30, 1899, and then publicly opened. Information furnished on application.
Jared A. Smith, Col., Engr's. June 29.

U. S. Engineer Office, Morgan Building, Buffalo, N. Y., May 25, 1899. Sealed proposals for harbor excavation at Erie, Pa., will be received here until eleven o'clock A. M. June 26, 1899, and then opened. Information furnished on application. T. W. Symons, Major, Engr's. June 22.

PROPOSALS FOR CONSTRUCTION OF FLAT BOATS.—U S ENGINEER OFFICE, Custom House, St. Louis, Mo., May 23, 1899. Sealed proposals for construction and delivery of sixty flat boats will be received here until 12 o'clock, noon, June 22, 1899, and then publicly opened. Information furnished on application. Edw. Burr, Captain, Engrs. June 15.

U. S. Engineer Office, Duluth, Minn., June 1, 1899. Sealed proposals for building pile and timber revetments for Ship Canals across Keweenaw Point, Mich., will be received here until noon, July 1, 1899, and then publicly opened. Information furnished on application here, or, at branch office Houghton, Mich. Clinton B. Sears, Major, Engrs. June 22.

U. S. Engineer Office, 185 Euclid Ave., Cleveland, O., May 12, 1899. Sealed proposals for constructing part of West Breakwater at Conneaut Harbor, Ohio, will be received here until 2 o'clock, p. m., central standard time, June 12, 1899, and then publicly opened. Information furnished on application. Jared A. Smith, Col., Engineers. June 8.

U. S. Engineer Office, 185 Euclid Ave., Cleveland, O., May 12, 1899. Sealed proposals for constructing part of West Breakwater at Fairport Harbor, Ohio, will be received here until 2 o'clock p. m., central standard time, June 12, 1899, and then publicly opened. Information furnished on application. Jared A. Smith, Col., Engrs. June 8.

U. S. Engineer Office, Galveston, Tex., May 15, 1899. Sealed bids, in triplicate, for deepening channel from Galveston Harbor to Texas City, Tex., will be received until 2 p. m., June 15, 1899, and then publicly opened. For information apply to C. S. Riche, Capt., Engrs. June 8.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., May 11, 1899. Sealed proposals for repairing government piers at Grand Haven, Mich., will be received here until 3 p. m., June 10, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 8.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., May 15, 1899. Sealed proposals for repairing government piers at Muskegon, Mich., will be received here until 3 p. m., June 14, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 8.